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ABSTRACT

This publication documents the ongoing efforts of the Government of Nepal to train primary school teachers using a multi-faceted distance learning system. At the heart of this system are radio broadcasts designed especially for untrained primary school teachers. A case study of the Radio Education Teacher Training Project (RETTP) is presented in four parts. The first part provides a brief overview of Nepal's sociopolitical development in the past 40 years with particular reference to changes in educational policy begun under the National Education System Plan (1970-76). Part 2 summarizes the RETTP's critical attributes and benchmarks, including the evolution of key course components and the impact of major policy shifts which occurred in 1984 and 1987. A comparative cost-effectiveness analysis of the RETTP's latest program, Basic Teacher Training, and its conventional face-to-face alternatives is presented in part 3. The study concludes in part 4 with a summary of the lessons that Nepal's experiences with the distance training of teachers offer to policy makers elsewhere. Fifteen tables providing cost analyses are appended. (Contains 31 references and 14 tables/figures.) (LL)

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Training Teachers at a Distance: A Case Study of Nepal's Radio Education Teacher Training Project

June 1991

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TRAINING TEACHERS AT A DISTANCE:

A CASE STUDY OF NEPAL'S

RADIO EDUCATION TEACHER TRAINING PROJECT

Dwight R. Holmes
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June 1991

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LIST OF ABBREVIATIONS

BTT	Basic Teacher Training course
CERID	Research Centre for Educational Innovation and Development, Tribhuvan University
DEO	District education officer/office
FOE	Faculty of Education, Tribhuvan University (formerly IOE)
HMG	His Majesty's Government of Nepal
IOE	Institute of Education, Tribhuvan University
MOEC	Ministry of Education & Culture
NESP	New Education System Plan (1970)
PEP	Primary Education Project (HMG/World Bank/UNDP)
RED	Regional education directorate/director
RETT	Radio Education Teacher Training Course (for under-SLC teachers)
RETT I	Radio Education Teacher Training Project, First Phase (1978 - 1983)
RETT II	Radio Education Teacher Training Project, Second Phase (1984 - 1990)
RETTP	Radio Education Teacher Training Project (the institution)
Rs.	Rupees--the Nepalese currency (1988 Rs. 28 = $1; 1978-90 average Rs. 21.50 = $1)
RT	Resource teacher
SIMs	Self-instructional materials
SLC	School Leaving Certificate
TU	Tribhuvan University
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Education Fund
USAID	United States Agency for International Development

TRAINING TEACHERS AT A DISTANCE: A CASE STUDY OF NEPAL'S RADIO EDUCATION TEACHER TRAINING PROJECT

1.0 INTRODUCTION

1.1 *Purpose and organization of the case study*

To satisfy basic educational needs and to provide "education for all" by the year 2000, countries throughout Asia, Africa and Latin America are seeking cost-effective ways to expand access to primary education and, at the same time, to improve the quality of existing schools. However, in many nations the provision of even minimally effective primary schools continues to be an elusive goal, one handicapped by high population growth rates, insufficient physical resources and a lack of qualified teachers. To redress the chronic undersupply of trained teachers, ministries of education assisted by a variety of international aid agencies are relying increasingly on distance training schemes of one kind or another.

The Government of Nepal's on-going efforts to train primary school teachers at a distance are documented in this case study. Prior to the inauguration of the Radio Education Teacher Training Project (RETTP) in 1978, only 63% of Nepal's primary school teachers possessed a School Leaving Certificate or SLC, the minimum formal qualification required by the Ministry of Education. Fewer still (only 39%) were graduates of existing teacher training programs. Furthermore, conventional teacher training programs were hampered by the lack of qualified candidates in many areas, inadequate incentive structures, severe manpower and logistical shortages, high dropout rates and the problem of replacing rural teachers while they attended residential courses.

To combat what once seemed an intractable set of educational problems, Nepal's Ministry of Education and Culture has developed over the past twelve years a multi-faceted distance learning system. Radio broadcasts designed especially for untrained primary school teachers, and supplemented by a variety of other instructional media, are at the heart of this system. In fact, to date no other distance teacher training system has relied so heavily on radio as its core medium of instruction. Accordingly, the ways radio has been used for teacher training in Nepal, including the selection and recruitment of participants, the balancing of diverse instructional methods, level of and effectiveness, and costs are the subject of this review.

The case study of RETTP is presented in four parts. The remainder of Part I provides a brief overview of Nepal's sociopolitical development in the past forty years, with particular reference to changes in educational policy begun under the National Education System Plan (1970-76). Part II summarizes the RETTP's critical attributes and benchmarks, including the evolution of key course components and the impact of major policy shifts which occurred in 1984 and 1987. A comparative cost-effectiveness analysis of the RETTP's latest program, Basic Teacher Training, and its conventional face-to-face alternatives is presented in Part III. The study concludes in Part IV with a summary of the lessons Nepal's experiences with the distance training offer policy-makers elsewhere. At the outset, the authors wish to acknowledge with sincerest thanks the help provided by the following persons, without whose

help this study would not have been possible: Mr. Hem Chandra Shrestha and Mr. Rameshwar Shrestha, RETT Project Chiefs, and other members of the RETT Project staff; Mr. Tri Ratna Tuladhar and Drs. Michael Calavan, Jean Meadowcroft, and Virgil Miedema of USAID/Nepal; and Dr. Steven Klees of Florida State University.

1.2 *Education in Nepal before and after 1951: An overview*

Nepal's quest for development began in 1951 when the House of Gorkha wrested power from the autarchical Rana family, which had ruled the nation for more than a hundred years. Prior to the revolution, this landlocked country, so nearly closed off from the rest of the world by the Himalayan mountains, was thoroughly isolated. Foreigners were denied entry without special permission--a privilege granted only to the British government's resident representative and a small number of other individuals. Neither were the Nepalese themselves allowed to travel freely[1]. Internal travel required a passport from the central government. People were forbidden to own radios, and the only domestic mass medium was a small, government-owned newspaper.

Alongside India, a country whose educational system experienced rapid development under British rule, Nepal spent a hundred years in educational (as well as social, political and economic) deprivation. Despite tentative attempts at reform and modernization by one or two of the more enlightened Rana prime ministers, particularly in the second decade of this century, and the opening of a greater number of schools in different towns of the country in the later years of the regime, until 1951 education remained essentially an underground commodity for all but the elite. There was one college, fewer than two dozen high schools, and altogether 321 primary schools in the entire country at that time. Only elite citizens were permitted to educate their children in any formal way. Those who were able to get their children out of the country, and could afford it, sent their children to school in India.

The growth of the education sector in the second half of this century has been dramatic. In 1951, there were 8,505 students attending primary schools in Nepal--by 1976 the number of primary *schools* exceeded that figure. Of the 8,505 students enrolled in 1951, only eighty-six were girls. The literacy rate, estimated to have been just two percent in 1951 reached 17% in 1976 and 34% in 1988. Although the country is still not in a position to make education compulsory, it aspires to offer "universal education" by the year 2000[2]. Given Nepal's relatively weak economy, its scarce natural resources, its fragile ecology, and its rapidly growing population (one which has increased from under nine million in 1951 to over eighteen million today), the task of expanding educational opportunities is a formidable one.

Nepal's education system consists of ten years of schooling (Grades 1-10) upon completion of which students must pass the School Leaving Certificate (S.L.C.) Examination in order to be considered a secondary school graduate. Since 1983, schools have been

---

[1] The famous "Gorkha soldiers" of British military fame were, of course, one group which was exempted from travel restrictions.

[2] "Universal education" is defined to mean that all students are within walking distance of a primary school.

structured in a 5+2+3 system, i.e. five years of primary, two years of lower secondary, and three years of secondary school. Students passing the SLC Exam may enroll in one of the campuses of Tribhuvan University, the national university.

All students, whether in public or private schools, must complete the SLC requirements in order to be secondary school graduates. Private schools offer nursery and kindergarten classes which are not part of the government curriculum. Private schools represent 4% of primary and lower secondary schools, and 6% of secondary schools. The percentage of students attending private schools at each level are 4%, 10% and 23%, respectively.

1.3 *Emergence of a national education system*

The New Education System Plan (NESP), introduced on a phase-by-phase basis in the early 1970s, was the first attempt to create a national education system, with uniform curricula, textbooks, and regulations. The NESP set forth minimum requirements for being a primary school teacher: The School Leaving Certificate (or SLC) obtained by passing the national examination upon completion of the tenth grade; and completion of a teacher training course. By 1976, 58% of Nepal's primary school teachers had completed their SLC (see Figure 1, below) while just 39% had been certified as trained (see Figure 2). Although this latter figure represented an increase of 21% over the NESP's first five years, by 1987 the portion of teachers with training had actually declined to 36%.

The share of SLC-pass teachers in the teaching force increased to 80% by 1987 (Fig. 1), indicating that the government was much more successful at producing high school graduates and recruiting them into the teaching profession than it was at providing them with training. In 1987, when Nepal's primary school teaching force exceeded 55,000, untrained teachers still outnumbered trained ones by a factor of two to one.

It was during the New Education System Plan's expansion phase that a six-person team sponsored by UNICEF, USAID, and the British Council undertook a feasibility study to determine the potential for utilizing radio for developmental and educational purposes in Nepal. The major outcome of that study was the launching of the Radio Education Teacher Training Project in 1978.[3]

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[3] "Development Radio for Nepal: Report of the Radio Feasibility Study Team" (Mayo et al., 1975)

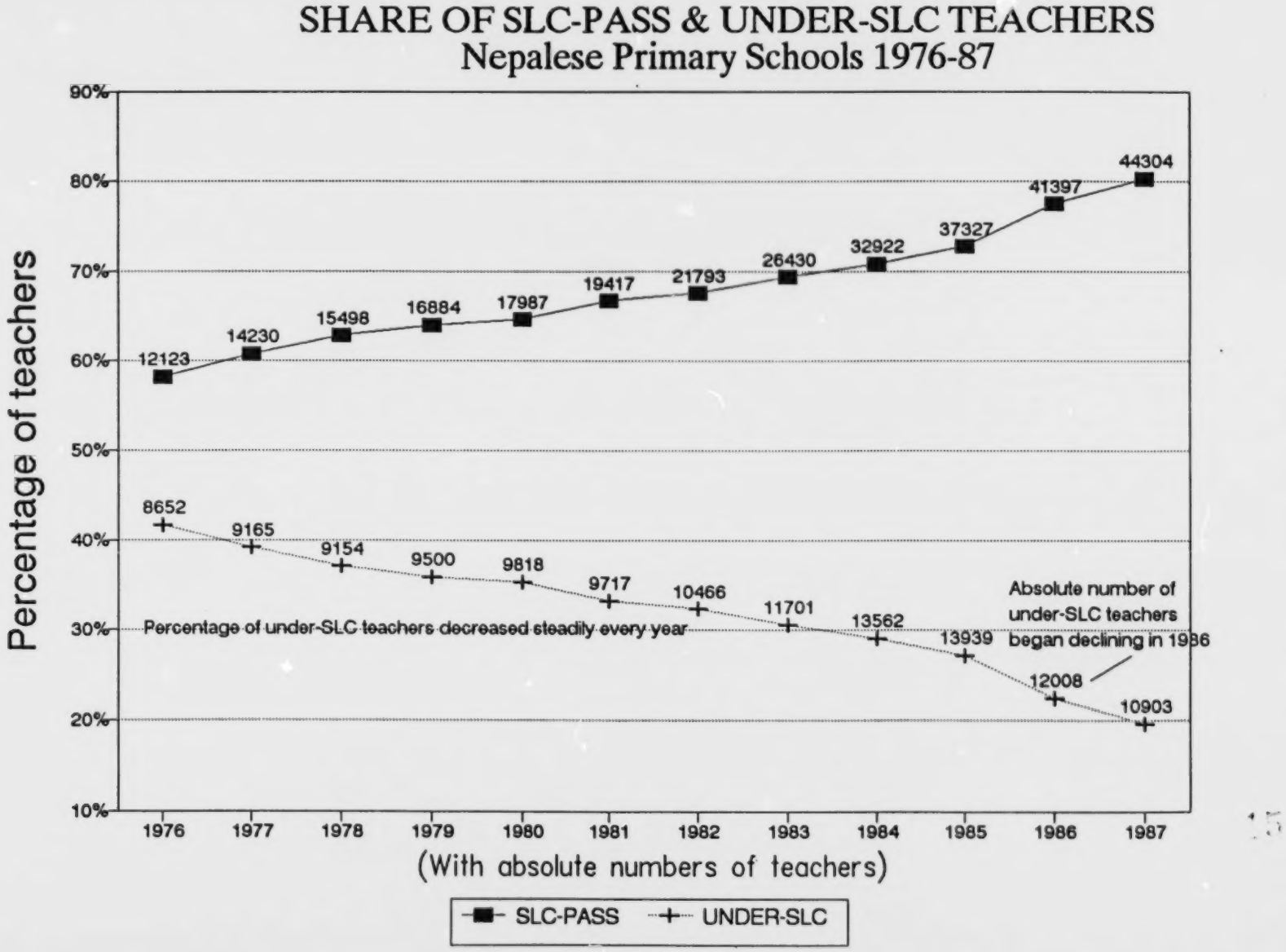
SHARE OF SLC-PASS & UNDER-SLC TEACHERS
Nepalese Primary Schools 1976-87
Percentage of teachers
90%
80%
70%
60%
50%
40%
30%
20%
10%
12123
14230
15498
16884
17987
19417
21793
26430
32922
37327
41397
44304
8652
9165
9154
9500
9818
9717
10466
11701
13562
13939
12008
10903
Percentage of under-SLC teachers decreased steadily every year
Absolute number of under-SLC teachers began declining in 1986
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
(With absolute numbers of teachers)
SLC-PASS
UNDER-SLC

Figure 1

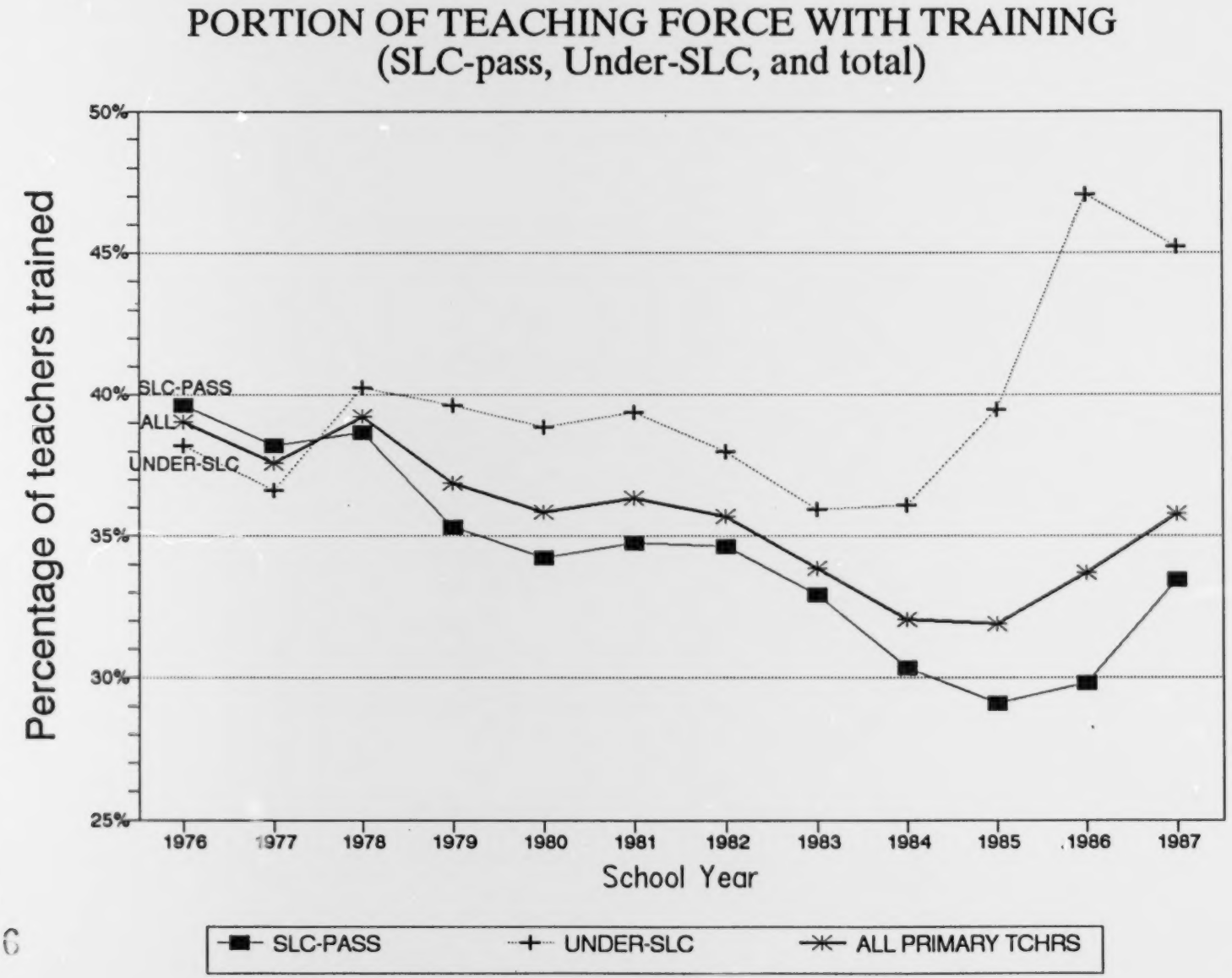
PORTION OF TEACHING FORCE WITH TRAINING
(SLC-pass, Under-SLC, and total)
Percentage of teachers trained
50%
45%
40%
35%
30%
25%
SLC-PASS
ALL
UNDER-SLC
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
School Year
SLC-PASS
UNDER-SLC
ALL PRIMARY TCHRS

Figure 2

1.4 *Why radio education in Nepal*

The Feasibility Study Team found no pre-existing consensus within the government or among the donor agencies regarding how radio might best be used for development purposes. Nevertheless, it identified potential projects falling under different developmental sectors. These included using radio in support of village extension and for the training of *panchayat* (village council) leaders. Three educational initiatives were also proposed: (1) a lower secondary expansion project, (2) a schools broadcasting project at the secondary/vocational level, and (3) a teacher training program. Although it had been the team's task to explore a broad range of uses for radio in development, it was the NESP's prominence within the Ministry of Education & Culture's (MOEC) agenda, and the local USAID mission's interest in educational radio which led both groups to embrace the teacher training project.

As early as 1974, it was evident that some alternative to traditional, face-to-face methods of providing teacher training would have to be utilized if the targets set forth in the NESP were to be met. Various forms of distance education were considered. Given Nepal's rugged, mountainous terrain and the absence of a reliable transportation system, making delivery of printed materials highly problematic, it was proposed that radio carry a larger share of the instructional burden than was typically the case in other distance education systems. Radio offered the best and cheapest means of reaching most of the country's schoolteachers. It also would enable trainees to be linked directly with the best teacher educators in the country--a response to the concerns already voiced at that time that the quality of teacher education was declining as the numbers going through the system increased. To do so, however, Radio Nepal--the country's only station--would have to increase its transmission capabilities and improve the quality of its broadcasts.

The project's original goal was to train 5000 teachers per year using a combination of radio broadcasts, brief residential sessions, and programmed texts. The assumption was that such a package could deliver a teacher training course at much lower cost than either the existing campus-based system or any of the other alternatives which had been explored. The team reasoned that within five years of full implementation of such a radio teacher training program enough trained teachers could be provided to cover all of the country's primary school classes.

At the same time, the feasibility team cautioned its sponsors that:

> If [the proposed teacher training program] is to be successful, a major developmental effort will be required to insure that the curriculum is well conceived, the radio broadcasts instructive and enjoyable, the textbooks comprehensible and reinforcing, and the residence sessions well-organized and strongly motivating for the teachers. (Mayo et al., 1975, p. 102)

1.5 *The typical teacher*

Before moving further, it may be helpful to describe the typical Nepalese primary school teacher. The following sketch is based on survey data collected from two cohorts of Basic Teacher Training participants:

> The typical teacher is a Brahman male under 30 years of age who lives at home with seven other persons, and speaks Nepali [the national language and only medium of instruction in public schools] at home. He is a farmer as well as a teacher, spending about 20 hours a week on farm and household chores. He has no other source of income other than his teaching salary and any income which might be made from the farm. Household-related duties frequently make it difficult for him to be home in time to listen to early evening broadcasts. Furthermore, the typical teacher spent 19 nights away from home in the last year, mostly on household- or school-related business.
>
> There is less than a 50/50 chance that he owned a radio prior to receiving one from the project, and he must purchase batteries for the radio--for as much as 5% of his salary--since there is no electricity in the village. (The only source of light at home is a simple oil lamp.) He particularly enjoys listening to the news and educational programs. Quite likely, he does not have a private room where he could listen to the radio attentively with ease.
>
> He has been teaching for nearly five years, and has taught in at least one other school prior to his present assignment. It takes him from between thirty and forty-five minutes to walk to school each day.
>
> Typically the first member of his family to have passed the SLC examination, he began teaching because it was the only job opportunity available in his village (or even in his district), and due to his inability——financially or otherwise——to gain higher academic qualification. His teaching job is a temporary appointment.
>
> He teaches 36 periods of class a week, out of a maximum possible 39. He teaches virtually all of the subjects offered in the primary school. Quite likely, he has to teach more than one class at a time during some periods. In addition to his class load, he also has other school-related duties, either in administration or extra-curricular activities. (Holmes, 1986; Karmacharya & Khatri, 1989)

2.0 HISTORY OF THE RADIO EDUCATION TEACHER TRAINING PROJECT (RETTP)

Agreement to undertake a radio education project along the lines proffered by the feasibility report was reached by His Majesty's Government and USAID in 1977, and a five-year technical assistance contract was awarded in the following year to Southern Illinois University. The project was to develop an institution capable of producing and administering radio-based teacher training programs.

2.1 *Evolution of teacher training priorities*

As mentioned above, the RETT project was launched during the implementation of the New Education System Plan. The plan called for the phasing out of all unqualified teachers (i.e., those with insufficient academic credentials) and the training of teachers at each level of the educational system. For primary teachers, completion of a 10-month, campus-based course became a prerequisite for the award of permanent teacher status (tenure), and the national university provided such training on all nine Institute of Education campuses. However, by 1979 it became clear that the capacity to train all teachers did not exist.[4]. Under heavy pressure from the National Teachers Union, which was frustrated by the backlog of teachers awaiting training, the government dropped its training requirements in 1981. With the tenure incentive no longer in place, the numbers of SLC-pass teachers attending training programs fell dramatically.

Under the NESP, it was anticipated that the great majority of new primary school teachers would be "SLC-pass," but it wasn't until 1986 that a downward trend in the numbers of under-SLC teachers was observed. In the meantime, "under-SLC" teachers--still representing 35% of Nepal's primary school teaching force in 1980--of whom nearly two-thirds were untrained were treated as "unwanted children." The decision to adopt under-SLC teachers as the RETT target group was made with the assumption that once this cohort of 6004 teachers was trained, the project could move on to other tasks. Although under-SLC teachers continued to be hired in succeeding years, the percentage of unqualified teachers did decrease gradually (see Figure 1). Still, the demand for teachers continued to outpace the supply of high school graduates, requiring that teachers without the requisite high school diploma be hired and trained. Thus, contrary to expectations, the RETT Project's original target group did not decrease rapidly in size. In fact, from 1980 through 1984, while the project was enrolling 5600 teachers in its courses, the number of under-SLC teachers increased by over 4000, and the number of *untrained* under-SLC teachers rose to nearly 8700.[5]

---

[4] Several alternatives to the traditional, campus-based format had been experimented with but none had proven to be efficient. These included a print-based "Distance Education Training" and the longer-lived "On-the-spot Training" which employed university faculty during vacation periods to travel to rural areas and conduct classes.

[5] Ironically, at a time (1981-1987) when most SLC-pass teachers still lacked training there existed the anomalous situation that the only teacher training activities being carried out which involved significant numbers were for the under-SLC group: the USAID-funded RETTP, and the UNDP-funded Equal Access

The choice of under-SLC teachers as RETT's first target group--a choice not anticipated in the feasibility study report——was based on two assumptions: (1) that few new teachers would be added to this group, enabling the entire cohort to be trained within a few years; and (2) that such a delimited undertaking would serve as the "breaking-in" phase for a radio-based, distance training system whose mandate then could be expanded in directions and on a scale envisioned in the original project design.

In retrospect, the decision to concentrate on under-SLC teachers contributed to the project's early difficulties. Teacher training was a task which had proven difficult in Nepal for even the best-educated teachers. RETTP was assigned a target group of teachers who were unqualified for their jobs. Many had less than an eighth grade education. In this endeavor, the project received little support or encouragement. That it was unable to accomplish much should not have been surprising; what should be surprising is that it survived at all.

RETT Project receives new mandate

In 1985, the trend of hiring new under-SLC teachers turned noticeably downward (see Fig. 1); and by 1987 fewer than 20% of Nepal's primary teachers were unqualified. At this point, and as part of Nepal's "Basic Needs for All by 2000" campaign, the teacher training curriculum was redefined. Instead of a single, ten-month in-service course, a four-step in-service program was proposed. The first step, entitled "Basic Teacher Training (BTT)," was comprised of 150-hours' of instruction in both pedagogy and course content.[6] Ministry officials saw this as a locally-conceived and relevant approach to the challenge of providing teacher training. All available resources were mobilized in the effort to meet the goal of providing basic training to the projected 80,000 primary teachers by the year 2000. In 1988, under direction from the MOEC, five agencies initiated independent, parallel BTT programs, all with equivalent certification. The five agencies were: (1) the MOEC's Regional Education Directorates; (2) the Faculty of Education, Tribhuvan University; and three donor-assisted projects, (3) the Seti Zone Project (UNDP/UNESCO/UNICEF); (4) the Primary Education Project (World Bank/UNDP); and (5) the Radio Education Teacher Training Project (USAID).

The RETT Project was informed in July, 1987, that it would henceforth conduct no programs for under-SLC teachers, but would begin immediately to design, produce and implement a 150-hours Basic Teacher Training course for SLC-pass teachers. For the first time, the project received a mandate which was consistent with overall national policy. There is no question that the functioning of the project improved following the shift in emphasis to

---

for Women's project (targeted at mostly under-SLC, female teachers). This explains the rise in the portion of this group who were trained, as seen in Figure 2.

[6] Following the 1987 decision, all efforts were focused on the design and implementation of the BTT course. The other three steps of the training program are yet to be implemented.

qualified, SLC-pass teachers. The frustrations experienced by project staff were over; RETTP had become an important piece of a coherent national education policy.

2.2 *RETTP, 1978-1990: Two projects, two target groups, three programs*

During the twelve-year period in which USAID supported radio teacher training in Nepal, three courses were developed for two target groups.[7] For under-SLC teachers, RETTP conducted five sessions of its under-SLC teacher training course, generally known simply as RETT, and two years of its Radio Tuition English program (designed to increase teachers' knowledge of subject content) between 1978 and 1988. Beginning in 1988, with SLC-pass teachers as the new target group, RETT's version of the 150 hours' Basic Teacher Training course was introduced. It is expected to run annually through at least 1998. The schema is shown in the following table, and data for teacher participation and completion for each course are given in Table No. 2.

[7] RETT II concluded on September 30, 1990, ending USAID's involvement with the project at least for the time being.

Table 1

RADIO EDUCATION TEACHER TRAINING PROJECT:
TWO PROJECTS, THREE PROGRAMS, TWO TARGET GROUPS
RETT I, RETT II & PROGRAM ACTIVITIES

YEAR	DONOR-ASSISTED PROJECT	TARGET GROUP: UNDER-SLC TEACHERS		TARGET GROUP: SLC-PASS
1978	**RETT I**			
1979	USAID	(1)		
1980	FIVE-	**RETT**		
1981	YEAR	UNDER-SLC		
1982	PROJECT	TEACHER		
1983		TRAINING		
1984	**RETT II**	COURSE	(2)	
1985	(USAID			
1986	FIVE-		**RADIO**	
1987	YEAR		**TUITION**	(3)
1988	PROJECT			**BTT**
1989	EXTENDED			BASIC
1990	TO SIX)			TEACHER
...	.			TRAINING
2000	.			COURSE

Table 2

NUMBER OF TEACHERS ENROLLED, COMPLETING, AND PASSING RETT PROJECT'S THREE COURSES, 1980-1990

RETT TEACHER TRAINING COURSE FOR UNDER-SLC TEACHERS 1980-87

YEAR	NO. TEACHERS ENROLLED	NO. COMPLETING COURSE*	NO. PASSING EXAM**	CUMULATIVE PCT. OF ENROLLEES WHO PASSED #
1980-81	117	(pilot year/no exam)		
1981-82	1000	(no exam)##		
1982-83	1934	2708	1103	36.2%
1983-84	1285	1246	1164	52.3%
1984-85	1257	958	677	52.6%
1986-87	836	459	534	54.1%
TOTALS:	6429	5371	3478	54.1%

* Completing the course is defined as enrolling in the course and appearing for the final exam
** This is the total number of enrollees (including those who repeated the exam) who passed
# This is the cumulative percentage of all teachers who have ever enrolled in the course who have passed
No exam was given until the end of the third broadcast year; thus all enrollees from the first three years had their first examination opportunity jointly in 1983; 2708 teachers appeared for that exam, or 88.8% of the 3051 enrollees

RADIO TUITION PROGRAM (ENGLISH) FOR UNDER-SLC TEACHERS 1986-87

YEAR	NO. ENROLLED	PARTICIPANTS TAKING:		COMPLETION RATE (%)*
		PRE-TEST	POST-TEST	
1986	184	171	149	81.0%
1987	289	274	220	76.1%
TOTALS:	473	445	369	78.0%

* As no certifying exam was given in this course, those teachers who took both the pre- and post-test were considered to have completed the course

BASIC TEACHER TRAINING (BTT) COURSE FOR SLC-PASS PRIMARY SCHOOL TEACHERS 1987-90

YEAR	NO. TEACHERS ENROLLED	NO. COMPLETING COURSE*	NO. PASSING EXAM**	CUMULATIVE PCT. OF ENROLLEES WHO PASSED #
1987-88	987	##		
1988-89	598	1267	1079	68.1%
1989-90	1789	1547	829	56.6%
TOTALS:	3374	2814	1908	56.6%

* Completing the course is defined as enrolling in the course and appearing for the final exam
** This is the total number of enrollees (including those who repeated the exam) who passed
# This is the cumulative percentage of all teachers who have ever enrolled in the course who have passed
1987-88 and 1988-89 sessions were run concurrently after repeating the first 40 lessons; the examination was held jointly; 1267 out of the total 1585 enrollees took the exam

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RETT under-SLC teacher training course

This course was open to all untrained, under-SLC teachers. It ran parallel to the conventional ten-month training programs offered on campuses and emphasized the pedagogy of all subjects taught in grades 1 - 3,[8] with a secondary emphasis on course content. The subjects were: Nepali, math, health, social studies, art, and physical education. In addition, education and rural development were included, the former to introduce teachers to the foundations of education, and the latter to inculcate attitudes and behaviors consistent with the model of "teachers as change agents."

Evaluation of the course at the end of its first phase indicated that teachers had increased their knowledge of course content, but that this had had little or no effect on attitudes or behavior in the classroom (Butterworth, et al., 1983). The evaluation team recommended shifting the program's focus from teaching methodology to teaching content, thereby raising the subject matter knowledge level of the under-SLC teachers which was judged to be quite weak.

The RETT course for under-SLC teachers continued up until the time when the MOEC declared once and for all that no further training would be offered to under-SLC teachers. The fourth and final examination for RETT participants was held in June, 1988. Altogether 6429 teachers representing all but three of the country's 75 districts were enrolled in six sessions of the program. Of these, 5371 (84%) completed the course and 3478 (54%) passed and received certification, thereby qualifying them for the 65 rupees (about $30, or 9% of the average teacher salary) per month training allowance. Demand for the course dropped off noticeably in the last two years of its operation. Education officers in many areas requested that their districts *not* be included, since they were in the process of substituting many of the under-SLC teachers with better qualified recruits. The final RETT session included teachers from just 35 districts, down from the 1982 peak of 69.

Radio Tuition program

Upon the recommendations of the RETT I final report, RETT II was developed as an instructional program for primary teachers. It covered the high school curricula in math, English, Nepali and science with the dual objective of raising the under-SLC teachers' knowledge of these subjects while at the same time helping them to prepare for the SLC examination. For various reasons, only English lessons were ever produced. The cohort of under-SLC teachers exhibited an extremely wide range of educational backgrounds and subject knowledge. Many of them had studied under the previous school curriculum for which the SLC exam was no longer being offered and, as a result, few of them had much chance of ever passing the exam. Add to this handicap the tenuous position they held in the school system--some actually were fired during the time they were enrolled in the course due

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[8] At that time, primary schools contained grades 1-3, lower secondary 4-7, and secondary 8-10. This configuration was changed in 1983, primary schools going to 1-5 program and lower secondary schools 6-7. The curriculum of the RETT course was never actually changed, though there were plans to do so.

to their lack of academic qualification——and it was not surprising that, in the words of the RETT II Final Evaluation Team:

> the purpose of improving the knowledge and skills of under-SLC primary school teachers to levels that would permit them to pass the SLC examination through radio-based in-service education proved to be unachievable (Anzalone & Mathema, 1989, p. i).

English competency was another major problem faced by the project. Although English is a required subject in Nepalese schools from grades four through ten, it is the subject most often failed by students who sit for the SLC. English competency levels among under-SLC teachers (14,000 in 1986) were so wide that it proved impossible to produce one 60-hour course package which could meet the needs of all students (Holmes et al., 1986).

The RETTP project developed a reasonably good English-by-radio instructional package, but where were the teachers who could benefit? Prior to the second session of the course an entrance test was administered to students who presumably had the requisite knowledge base to benefit from the course. Of 658 promising applicants (out of approximately 2600 under-SLC teachers from ten districts) only 100 were able to score 40% or better on the test. Eventually the entrance standard was lowered to 32%, enabling 319 teachers to participate. However, this number represented only 12% of the under-SLC population in the ten districts. In other words, the radio project catered to only twelve percent of a group of unqualified teachers, most of whom had little hope of ever passing the SLC exam. In short, there was insufficient motivation, financial or otherwise, for teachers to enroll or complete the program. Eventually 473 teachers from 10 districts did enroll in one of the course's two sessions. Of this group, 369 (78%) took the post-test.[9]

Despite the poor match between the project's goals and target group, it was widely recognized that the RETT Project made great strides in its "capacity to design, implement, and evaluate radio education activities" (Anzalone & Mathema, 1989). That the MOEC, too, recognized this is evident from the fact that, mid-way through RETT II, the project was called upon to drop all of its under-SLC programs, and to develop its own version of the new BTT course for SLC-pass teachers.

Basic Teacher Training course

Some version of this course was required of all 27,000 untrained teachers who lacked permanent status in 1987. It was further estimated that the number of SLC-pass teachers requiring training would be 80,000 by the end of the century. The BTT radio course had much in common with the earlier RETT course for under-SLC teachers. It included

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[9] One hypothesis to explain this relatively high completion rate is that many of the teachers believed there was a reasonable chance that, were they to perform well enough on the post test, they would be granted an exemption to the SLC-pass requirement for remaining in the teaching profession.

instruction in both teaching methodology and subject matter content for all of the subjects introduced in the primary schools. In addition to Nepali, math, social science, and health--the four major subjects of the RETT curriculum--English and science were added, reflecting the fact that primary schools now contained fourth and fifth grades, in which these subjects were taught. Education was retained as a subject in this course, too, although the rural development curriculum was dropped. Minor subjects (Sanskrit, art, P.E., moral education) were also included but with only two lessons devoted to each.

2.3 *Evolution of a distance teaching system: Course components*

Although the three teacher training courses produced by the RETT Project varied in terms of purpose and target audiences, there emerged over time a balanced set of course components whose development reflected program resources and constraints. The priorities in each instance were to maximize learning and to minimize the participants' feeling of isolation within a reasonable time frame and budget. Major constraints included the availability of listeners and air time; travel costs and the difficulty of fielding staff and supervisors for long periods; and the conflict between production deadlines and the timing of formative evaluation activities.

Over the course of twelve years, the RETT Project matured as an institution. With the benefit of experience, project leaders were able to convince MOEC officials that certain components--face-to-face sessions, for example--were necessary for the success the programs and therefore warranted increased investment. In this section, we will describe the eight course components of RETTP's BTT program--radio distribution, radio lessons, print materials, contact sessions, supervision, evaluation, admissions and examinations--along with a brief explanation of their historical development within the Nepalese context.

Radio distribution

Estimates vary concerning the percentage of Nepalese families owning radios, from a low of about 6% among the general population in 1973, to a high of 41% among teachers' families in 1988.[10] Despite the inference that radio ownership has increased substantially, approximately 60% of Nepal's primary school teachers still did not have access to a radio in their home as of 1988. Attempts to deliver radio-based instructional packages in Nepal therefore have involved some provision for making radios available to the participants.

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[10] New Era's 1973 study found that one out of every 18 families possessed a radio--and that the rate was no different for teachers than for any other occupational group (New ERA, 1973). One RETT I project report estimated radio ownership among project participants at 17.5% (Paige, et al., 1984). A later study in two rural districts found that between 28 and 32% of the families not living in town areas owned a radio. It also found that the incidence of ownership among teachers fell within the same range (Gurung & Holmes, 1983). Surveys of participant teachers by the project in 1988-89 indicated that 41% of the teachers had a non-project radio at home (Karmacharya & Khatri, 1989).

In RETT I, radios were consigned to District Education Officers (DEOs) and loaned to participating teachers for the nine-month course. This arrangement was never satisfactory, and the condition of the radios deteriorated quickly, such that by the end of that phase few radios were found to be in working condition.

Throughout the RETT II phase, radios were sold to teachers on an installment basis. Teachers assumed responsibility for maintaining their radios and for providing batteries. Since USAID was able to import receivers free of duty and excise taxes (together, normally about 50% of the original value), participating teachers received a valued item at a bargain price. So much so, in fact, that some officials suspected that teachers would be inclined to enroll in courses solely for the purpose of obtaining a radio. Given the low drop-out rates (discussed below in 4.2) and other evidence gathered by the project, however, there was no evidence to substantiate such a fear.[11]

The logistics of ordering large numbers of radios, delivering them to district offices and then selling them to enrolled teachers on an installment basis constituted a significant administrative burden for RETTP personnel as well as the DEOs. Despite these difficulties, the arrangement was successful in providing teachers with the main course instrument, a radio. Until such time that the majority of Nepalese teachers can afford to purchase their own radios in the marketplace, radio distribution will continue to be an important aspect of the system.

Radio lessons

The BTT program's radio lessons followed the design set forth from the beginning of the project and adhered to ever since: Two formal "lessons" divided by a non-formal magazine segment. (In BTT, each lesson lasted twelve minutes and the Magazine Show six minutes, whereas in RETT each of the lessons as well as the magazine segment were twenty minutes in length.) Providing a break between two instructional segments proved to be a popular idea, and the Magazine Show, which explored a wide range of topics, ranging from women's legal issues to a popular serial drama based on village politics and development issues, contributed significantly to the popularity of the series with teachers. In addition, the Magazine Show offered the "Teacher's Corner," which served as both a question-and-answer session and a forum for reading and responding to teachers' letters.

BTT was broadcast for just thirty minutes each day whereas RETT consumed a full hour. RETT programs were broadcast on a single short-wave frequency, while Radio Nepal's regular programming continued on all other bands (thus allowing the project some freedom

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[11] The real problem with this aspect of the project had nothing to do with arrangements between the project and the participants, but between USAID and the government of Nepal. The project plan called for a special account to be set up. Funds from the sales of radios to teachers were to be placed in this account, and the money used to purchase additional radios. Unfortunately for the participants, this stipulation was included as a "condition precedent" in the project agreement and, as a result, the ordering and delivery of radios was delayed at some length while the legal aspects of the account were worked out to the satisfaction of the two governments.

in choosing the broadcast time), whereas the BTT programs were broadcast simultaneously on all of the station's frequencies. This meant that the project had to compete with other development agencies in the country for prime time slots, and Radio Nepal was unable to allocate more than a half hour of air time per day to the program.[12] This resulted in a BTT course of nine months' duration (240 broadcast days).

Radio Tuition was by nature, of course, quite a different kind of program from either the RETT or BTT courses. Its instructional design was based primarily on an interactive radio methodology involving sequences of modeling statements or questions. Listeners responded with written or oral "answers." The pilot year's experimentation with a 20-minute program on short-wave proved to be disastrous on both counts. More instruction time was required, and the reception quality had to be excellent if the learners were to understand the broadcasts. The lessons were thus lengthened to thirty minutes and broadcast on medium- as well as short-wave bands.

The RETT Project has its own radio production staff--two producers and two studio technicians, when at full strength--and records all of the programs in its own studio facilities. Tapes are delivered to Radio Nepal each day, for broadcast that same evening. The tapes are picked up the following day and returned to the project offices.

Print materials

BTT provides teachers with a set of four self-instructional books (known locally as Self-instructional Materials, or SIMs) containing 480 lessons. Each lesson corresponds to one radio lesson. Although the SIMs vary in format depending on the subject, they generally contain summaries of each lesson along with "questions for thought" and a number of self-test items. The series of SIMs developed for the RETT were more elaborately illustrated than are those for BTT; however, this proved too expensive to maintain in the long run.

Since the Radio Tuition broadcasts were based on existing English textbooks for grades 7 - 10, the latter were distributed to participants, along with a small dictionary. However, plans for supplementary workbooks (which were adopted in response to feedback from teachers) were not implemented before the Radio Tuition course was discontinued.

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[12] Given the inconsistent quality of Radio Nepal's short-wave transmissions, the use of a single short-wave band was never a satisfactory arrangement, and teachers wrote hundreds of letters over the years reporting poor reception of RETT broadcasts. During the Radio Tuition years, when teaching English-by-radio on short wave turned out to be wholly unacceptable and the MOEC supported paying significantly higher rates to broadcast the program on all of Radio Nepal's frequencies--including medium-wave--in prime time, the project was able to collect evidence supporting the benefits of better reception for the participants. It was then able to negotiate a similar arrangement with Radio Nepal for the new BTT course in 1988. However, Radio Nepal--the nation's *only* radio station, broadcasting essentially on only one channel--was unable to offer a one-hour time slot on all frequencies: So the half-hour per day format was agreed upon for BTT--resulting in its longer, 240-day broadcast calendar.

Table 3

DAILY & SESSION BROADCAST SCHEDULES

PROGRAM SCHEDULE:	RETT (1984-85)	RADIO TUITION (1987)	BTT (1988-89)
Total broadcast days.....	159	117	240
Total broadcast hours.....	159	58.5	120
Total no. lessons.....	318	117	480
Minutes per lesson.....	20	30	12
Total formal hours.....	106	58.5	96
Magazine Show (min./day)...	20	-	6
Total magazine hours.....	53	-	24
No. lessons per program....	2	1	2
Daily program length (min.)	60	30	30
Broadcast time slot.....	5:30-6:30	8:15-8:45 pm	5:30-6 pm
No. broadcast frequencies..	1*	all bands**	all bands#

* RETT was broadcast on one short-wave frequency, usually the 60-meter band, while regular programming continued on Radio Nepal's other frequencies.

** Radio Tuition was broadcast (in its second year) during prime time on all meter bands: Two medium wave stations and both short-wave frequencies, (60 & 90m or 60 & 41m depending on the season).

\# BTT is broadcast on all meter bands in the 5:30 - 6:00 time slot

Contact sessions

In addition to the radio lessons and SIMS, the BTT offers a half-day teachers' orientation, a 30-hour face-to-face practical session, and a system of monthly "resource teacher sessions" for the participants. Such contacts are a vital and necessary component of the RETT distance education system.

The original RETT design called for a two-week orientation workshop, followed by bi-monthly two-day workshops throughout the broadcast year, and a larger residence session leading up to the final examination. Except for the pilot year of 1980-81, which itself ran only four of the scheduled eight months, the contact sessions were dropped from the RETT course for under-SLC teachers. Prohibitive costs were cited, but the RETT I Final Evaluation Report provided an additional reason:

> While the workshop concept may be essential to the success of the program, there is the question of the feasibility of providing the trained manpower to run these workshops in nearly all the districts of the country. To be effective,

> workshop leaders should be able to demonstrate the different techniques presented in the program, critique teachers in practice sessions, and lead discussions to clarify information presented in the radio broadcasts and SIMs. (Butterworth, et.al, 1983, p. 18)

For a variety of reasons, project administrators were unable to mount the logistical effort required to run contact sessions in more than a few districts. As a "project" not formally attached to Nepal's educational system, RETTP had few human resources of its own to draw on, and no mechanism for mobilizing other resources within the ministry.

The absence of face-to-face contact with teachers was the most oft-cited shortcoming of the original RETT course. Furthermore, the contradictory nature of the course itself--the fact that MOEC leaders were determined to replace under-SLC teachers--allowed the program to run "as is;" that is, without a face-to-face component.

Sessions of two to four days' duration were introduced as part of the Radio Tuition course in 1986, and teacher feedback was uniformly positive. The more personal contact the better, as far as the teachers were concerned. Of course, this course ran in only a limited number of districts and never incorporated more than 289 teachers at a time. Also, Radio Tuition's face-to-face sessions were conducted by one to three RETTP staff and, at such a small level of commitment, the program was feasible.

When the MOEC instructed the RETT Project to develop a new course within the guidelines of the BTT 150-hours' framework, project leaders restated their case for mandatory face-to-face contact sessions. Subsequently, it was agreed that the 150 hours' course would be divided into 120 hours of radio instruction and 30 hours (requiring 5 days) of a face-to-face "practical session." Implicitly, the MOEC committed itself to providing necessary funding and manpower. In addition to the 30-hour practical sessions, there were also to be one-day orientation sessions in each district.

A resource teacher system was also proposed as part of the BTT course. It was based on work of the Primary Education Project (PEP) and the Seti Zone (or Education for Rural Development, Seti Zone) Project which the government had launched in the mid-1980's. Both projects employed a system of satellite schools in order to decentralize supervision and face-to-face training procedures in a country where distances are generally measured in "days walking." Secondary teachers at resource schools received training in conducting one-day sessions for headmasters and teachers from surrounding primary schools. The resource schools were rewarded for their extra efforts with some budgetary support.

The BTT course was organized in an innovative way. Rather than scattering itself across the country, enrolling thousands of isolated teachers, a "saturation strategy" was employed. *All* eligible (i.e., SLC-pass, untrained) teachers in a given region were invited to enroll in the course in a given year. The idea was to exhaust all of the target group in a limited geographic area at one time, and then to move on to another region. When the first set of districts had hired enough new, untrained teachers, the course could be repeated in those same districts, but not more than once every three or four years.

The purpose behind the satellite school strategy was to build up a critical mass of teachers in all of the areas in which the course was being run, thereby enabling "cluster groups" to be organized which could meet on a regular basis--typically one Saturday every

month--under the guidance of "resource teachers" (RTs). Teachers were assigned to groups so that they could travel to and from the sessions without having to spend nights away from home.

RETTP proposed a payment of Rs. 150 per session (approx. $6--about seven hours' pay for the average high school teacher) to the Resource Teachers. Approval of the payment scheme was delayed so this component of the project was not fully implemented until the 1989-90 session of BTT. Resource Teachers were encouraged to enlist other teachers to instruct especially difficult subjects, notably English and science.

HMG originally intended that RETTP would serve the more remote districts of the country, those without access to an education campus. In the end, however, a very different format proved to be more practical. It proved easier to get teams[13] of four or five teacher trainers out to the more remote regions to conduct 25-day training sessions, than it did to set up multi-faceted distance teaching courses for the same areas. In sum, the radio-based BTT system, with monthly cluster group sessions with RTs and end-of-session 30-hour practical sessions, has created the means of providing training at a distance to virtually all of a district's untrained teacher population in just one nine-month session. Given that the average number of untrained, SLC-pass teachers is about 325 per district (1988), and that the MOEC-administered face-to-face, 28-32 day sessions generally accommodate between 40 - 60 teachers, it is obvious that the RETTP BTT course package has the potential to make an important contribution to the MOEC's campaign to train 80,000 primary teachers by the year 2000--even if the focus is in the more accessible rather than the remoter districts of the country.[14]

Practical sessions were planned to bring together about 150 participants with four trainers for a five-day residential session. They encouraged hands-on work in the design, construction and use of simple, locally-available teaching materials, along with modeling of different teaching techniques. For most activities, the participants divided into three sections, so that they worked with trainers in classes of fifty. The fourth trainer (generally the site coordinator) concentrated on the managerial aspects of the sessions. It was not feasible to arrange for practice teaching time, given the numbers of teachers involved and the short duration of the sessions. However, micro-teaching allowed teachers to work in teams preparing lessons and teaching to a "class" of their peers.[15]

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[13] The teams consisted of Faculty of Education instructors, Regional Specialists, District Supervisors and high school teachers from a given area.

[14] Thus far the RETTP BTT course has focused on the districts in the regions around Kathmandu. This is because the project leadership wanted to restrict coverage to Radio Nepal's medium-wave reception area. It is anticipated that in 1992, when the installation of new transmitters will expand medium-wave coverage to approximately 90% of the country, RETTP will be able to move effectively into new areas in the eastern and western parts of the country.

[15] The exact shape and nature of the practical sessions has changed each of the three years since BTT has begun: Beginning with the original design of a five-day, 30-hours' program, this was cut to a four-day, 28-hours' program in 1990 due to government-wide revenue shortages in the wake of political changes and economic instability in the country. And, for the 1990-91 session---the first to be run without donor

Supervision

In the BTT course, district supervisors assist in the recruitment and enrollment of teachers, radio distribution and orientation, and running of the practical session and exam. They also monitor the RT's and conduct of the monthly contact sessions. This arrangement is more realistic than were earlier attempts to utilize district supervisors in the day-to-day supervision and guidance of participating teachers.

One problem plaguing all projects in Nepal's education sector is that district supervisors are typically few in number (as few as 3 or 4 in many districts) and are generally burdened with administrative duties. Furthermore, getting around in Nepal is not easy and the DEOs do not have adequate budgets to fund frequent field trips. Supervisors customarily are expected to oversee many projects within a given district[16], so there is no guarantee of getting their focused attention. The lack of success in incorporating DEOs into the RETTP system was the primary reason behind the development of the RT and cluster group systems. The fact that the RT's are fellow teachers and are much more accessible to the course participants than are supervisors, are important reasons why the RT system is a preferable arrangement. The DEOs and supervisors continue to play an important role in the system--but relieving them of the role of providing the link between the central office and the teacher at their home or school has enhanced the BTT program, and contributed to its sustainability.

Evaluation

The role of *formative evaluation* in the development of innovative educational programs is frequently emphasized, particularly ones as complex as the Nepal's Radio Education Teacher Training Project. Although rigorous formative evaluation of the scriptwriting/production/evaluation cycle was a feature of the RETT I project design, it was discontinued before most radio lessons or SIMs had been completed. This shortcoming was cited in the project's final evaluation as one of the major reasons for its evident ineffectiveness (Butterworth et al., 1983). In response, a considerable portion——roughly 11%——of RETT II's budget was earmarked for research and evaluation activities (AID/Nepal, 1984). Major efforts were also made within the Radio Tuition program to improve materials through field trials. Ironically, it proved unfeasible to duplicate an evaluation program of comparable breadth and intensity once the BTT cycle began. Project staff was given only six months to get an entirely new program of 240 lessons covering seven

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assistance——much of the curriculum previously covered during these sessions was shifted to the agenda of the monthly cluster group sessions. End-of-year sessions were reduced to just two days. (The cost analysis, below, is based on 1988-89 data, when the full five-day sessions were run.)

[16] These might include, for example: A school lunch program, one of several adult literacy or *cheli-beti* (out-of-school girls education) programs, population education, PEP, Seti Zone, etc., in addition to education components of the various regional IRDPs, or integrated rural development projects.

major subjects on the air. There simply was not enough time for formative evaluation of the radio lessons. Furthermore, the scriptwriting staff was kept too busy producing SIMs to allow them to get to the field with any frequency. Nevertheless, field trips were made for the purpose of on-the-spot observations. On the basis of such visits, some adjustments were made in the SIMs and some lessons were revised prior to the *second* year of broadcasts.

RETTP's formative evaluation program consisted of essentially two components: (1) regular, weekly observations of teachers working with the recorded lessons at project headquarters and (2) on-the-spot visits to the homes of participating teachers to gauge how they received the broadcasts. For the former, groups of teachers from nearby (but rural) schools were organized for weekly listening groups for both the Radio Tuition and BTT series. They made regular visits to the project office to listen to new lessons. Scriptwriters and producers assessed how the teachers were reacting to the radio characters, actors voices, speed and style of the language used, etc. Pre- and post-tests measured how much learning occurred.

Although the "weekly observation group" was an essential component of the evaluation plan, it could not substitute for actually observing teachers as they listened and responded to radio lessons in their homes. To fulfill this need, a program of field trips was initiated. It involved transporting scriptwriters and evaluators to the teachers' houses for on-the-spot observations. Findings from these trips illuminated the problems teachers encountered during the first year of Radio Tuition broadcasts--problems with reception, actors' voices and the teaching methodology employed in the lessons. Such observations led to a major overhaul of program design and helped to convince MOEC officials of the need to hire more experienced radio actors. Negotiations were also undertaken with Radio Nepal for the use of medium-wave as well as short-wave bands, and for a broadcast slot more convenient for teachers. In the case of Radio Tuition, despite the problems of the basic mismatch between the level of the school curriculum on the one hand and target group on the other, the rigor and comprehensiveness of the evaluation component enabled the project to produce a series of programs of professional quality in the second year.

For the purposes of *summative evaluation*, tests were developed and administered to one-third of the teachers in the BTT's second session, and to all teachers enrolled in the Radio Tuition course. Such tests measured teachers' achievement gains in the different content areas. Results are discussed in section 3.4, below. Unfortunately, no testing program was initiated during any of the RETT sessions for under-SLC teachers.

Admissions

As explained above, the BTT course is administered in a limited number of districts each year, and is open to all of the eligible teachers in those districts. This practice varies with those established during previous RETTP programs and the tradition of Nepal's teacher training programs in general. Formerly, districts were assigned a fixed "quota" for each session, which served as a ceiling figure for teacher enrollments. Admissions procedures are still established by the project and then communicated to the DEOs who are responsible for recruiting and enrolling teachers locally. In cases where there is a limited enrollment quota, most DEOs report that they select teachers for training on the basis of seniority.

Informing and registering teachers for training are not easy tasks. Communications are poor under the best of conditions in Nepal. DEOs do not have sufficient budgets to enable them to mail circulars to all schools on a regular basis. Letters are carried almost exclusively by hand. The situation is further complicated by the government calendar. The inclusion of districts in the coming year's program requires approval by the MOEC, and this generally comes as part of the annual workplan and budget approval process which culminates in June. Since RETTP broadcast years generally begin in August, there is never more than two months' advance notice of training opportunities. A partial solution to these problems has been to rely on paid advertisements on Radio Nepal to make announcements regarding upcoming courses and enrollment procedures.

Examinations

Examinations conducted by the RETT Project are consistent with patterns established in Nepal. An RETT Examination Board has been established within the MOEC which is responsible for policies as well as for assigning persons to prepare examination questions. Test items generally are of two types: Fill-in-the-blank questions requiring one word or short phrase answers; and questions requiring "short essay" responses. Test items are usually composed by subject experts using the course curriculum. No attempt is made to check test items for validity or reliability. The final selection of questions and exam format rests with the Exam Board.

The grading of the exams is also done by subject experts assigned by the Exam Board, some of whom work at the RETT Project and some of whom do not. The process is overseen by an examination chief to ensure secrecy. Teachers must obtain a mark of 50% or better on all tests (same as the university standard) in order to pass the exam and gain certification. Individual results are announced after the board has approved the entire process and its results.

RETTP examinations (both for BTT and earlier for RETT) fit wholly within the patterns established for the School Leaving Certificate Examination. Given this tradition, it is difficult to use the examination results for any other evaluation purposes. For example, there is no way of verifying what the exams are actually testing or whether or not they are discriminating accurately among teachers in terms of specific learning outcomes.

3.0 COMPARISON OF RADIO-BASED & FACE-TO-FACE BASIC TEACHER TRAINING COURSES: COMPONENTS, IMPACTS AND COSTS

From this point in the case study, we will focus on the Basic Teacher Training (BTT) course, its main components, management, completion and pass rates, learning gains, and costs. In most respects, the BTT represents the cumulative development of radio education in Nepal and, specifically, its capacity for teacher training. It is thus an expression of what the project as an institution has learned in more than a decade of experience. As one of five parallel courses, BTT also offers an invaluable opportunity for comparison with more traditional, face-to-face teacher training methods. In some cases, general comparisons are possible; in others, and particularly those

incorporating cost data, comparisons between the radio-based training program and the alternative version of the program being conducted by the MOEC's Regional Education Directorates and District Education offices are most appropriate.

3.1 *Course components*

Radio-based BTT course

The radio-based course administered by the RETT Project consists of the nominal 150 hours of instruction which is broken down into 120 hours of radio lessons and a 30-hour practical session. The radio lessons are one-half hour in length, and are broadcast six days a week for approximately nine months. Broadcast time is in the evening, after teachers have reached home. Each half-hour (actually 29:30 minutes) lesson consists of two, 12-minute formal lessons and a five-and-a-half minute Magazine Show which is a forum for teachers' questions and comments, as well as items of topical interest. Altogether, 480 radio lessons and 240 broadcasts have been produced. Math and Nepali each have 100 lessons; English 80; science, health and social studies 50 each, and education 40. The remaining 10 lessons cover four other subjects taught at the primary level (art, physical education, Sanskrit and moral eduction) as well as two final, review lessons.

The character of the lessons varies significantly across subjects. The theoretical aspects of pedagogy are covered in the forty education lessons, which utilize a discussion format, including two teachers. Math lessons often include intractive games, riddles, or other activities where the listeners are asked to respond by solving the problems. Health lessons typically utilize dramatic dialogue between the mentor (health worker), mentee (school teacher) and other villagers clarify health concepts and explain how best to teach them. All of the subjects employ classroom simulations segments in some lessons, whereby different techniques (such as leading class discussion, using answers to provide positive feedback to students, conducting language drills, etc.) are modeled.

Practical sessions are held toward the end of the broadcast cycle and last for five days each. Up to 150 teachers are brought to a site within their district for thirty hours of instruction, materials construction and peer teaching.

The intent of course planners to include practice teaching as part of the practical session proved to be impossible to implement. It was not feasible to schedule monitored teaching time for each of up to 150 teachers within the available time. It was decided, instead, to conduct peer teaching sessons, whrer the trainers work in teams, teaching to and receiving feedback from their peers. The bulk of the time is given to presentations by the trainers and preparation of materials by the trainers.

During orientation and prior to the initial broadcast, teachers are provided with a set of Self-instructional Materials (SIMs) comprised of 1-2 page units corresponding to each of the 480 radio lessons. Teachers are also given the opportunity to purchase a three-band transistor radio (short-wave being necessary to receive Radio Nepal in many parts of the country) at a cost considerably below the market price, with the option of paying on an installment basis.

In addition to this basic structure, the project also includes a supporting "Resource

Teacher System" as part of the course package. It provides participants the opportunity to meet once a month with fellow trainees (30-40 in each cluster) and one or more resource teachers (high school subject teachers) to discuss and clarify issues related to training. Financial support is channeled through the district education offices to facilitate monitoring of the system by supervisors. The project solicits direct feedback from the enrolled teachers by means of pre-printed, stamped aerogramme questionnaires which are distributed to the teachers at the beginning of the program, and which are expected to be returned on a monthly basis.

A final exam is conducted (at the same centres where practical sessions are held) at the end of each course. There are two three-hour parts of the exam, administered on consecutive days. Teachers must pass all of seven subjects (math, Nepali, English, science, social studies, health and education) with at least 50% marks in order to pass the course.

In addition to the 150 hours of formal instruction (120 hours of radio lessons and 30 hours' practical session) teachers meet with resource teachers for a total of 24 hours (generally 3-hour Saturday sessions once a month for eight months), four hours of orientation prior to the start of broadcasts, and eight hours of exams. Add to that two hours for filling out the eight aerogramme questionnaires, and a minimum of eighty hours for studying the 480 SIMs lessons (at ten minutes per lesson), and it can be estimated that there are actually up to 215 hours of "contact" between the enrolled teacher and the course package, plus the twenty-nine hours of the non-formal Magazine Show.

Face-to-face BTT course

The face-to-face BTT courses are administered by the Ministry of Education & Culture through its Teacher Training Unit and the Regional Education Directorates. They are typically held at high schools, university campuses, village training centers, and other convenient locations. They last for 28-32 days. Each day's work is scheduled to last for 5 hours, exclusive of extra-curricular activities, adding up to approximately 150 total hours of instruction. The 150-hour course is entirely self-contained, from orientation through to the final examination, and is completed within a single month. However, the inclusion of a number of extra-curricular activities (P.E., music, etc.) in the course extends it well beyond the 150 hours of formal instruction.

The average session is attended by fifty teachers and is conducted by five trainers. The trainers are either supervisors or high school teachers who are trained by teams of university teacher educators in sessions lasting two or three weeks.[17] The regional and district education offices are given the responsibility of administering the face-to-face training programs, utilizing local specialists, supervisors and teachers. Materials have been developed for each of the subject areas and these are distributed as handouts during the training sessions.

Unlike the radio-based BTT, wherein all trainees undertake the same curriculum, three different subject packages are offered by the face-to-face program. The latter include forty hours of instruction in education; the remaining 110 hours are comprised of (1) Nepali, health

[17] Training for English trainers lasts for 21 days; training for other subjects lasts 14 days.

and social studies; (2) math and science; or (3) English. A final exam covers all of the subjects covered during the training. Teachers must correctly answer 50% of the questions to pass the exam and gain their basic teacher certification.

Beyond the original codification of the BTT curriculum as a "150-hours, basic-level primary school teacher training for SLC-pass teachers," and despite the MOEC's active participation in the approval process for both BTT course programs, significant differences have developed over time within the two approaches. RETTP has adhered to the 150-hour formula as the basis for its radio broadcast plus face-to-face practical session structure, but has added other features (such as the answer-back aerogrammes, the SIMs books, and the resource teacher sessions) to enhance its distance education system. Experience gained on two previous radio teacher training programs suggested the need for ancillary channels for contacting teachers and maintaining their interest. The result was a course which grew to 215 hours of contact time, 244 hours if the twenty-nine hours of non-formal Magazine Show programming are counted. By contrast, the face-to-face training is completed wholly within the allotted 150 hours' framework. Hour estimates for both programs are exclusive of extra-curricular activities, however.

The structure of the two courses is summarized in the following table:

TABLE 4

TEACHER TIME ASSOCIATED WITH COURSE COMPONENTS:
RADIO & FACE-TO-FACE PROGRAMS
(Based on 1989-90 Courses)

RADIO-BASED TRAINING			FACE-TO-FACE TRAINING		
NO. HOURS		COMPONENT	NO. HOURS		COMPONENT
96	hrs	Radio contact, formal*	150	hrs	Face-to-face session#
(29	hrs	Radio contact, non-formal)			*includes:*
2	hrs	Aerogrammes (8 x 15 min.)			•orientation
80	hrs	SIMs (reading/studying)*			•instruction
24	hrs	Resource Teacher sessions			•discussion/review
4	hrs	Orientation session			•final examination
30	hrs	Practical session*			
8	hrs	Final examination*			
215	hrs.	Contact time (plus 29 hrs non-formal)	150	hrs.	Contact time
-PLUS-			-PLUS-		
•homework &			•homework &		
•extra-curricular activities (during practical sess.)			•extra-curricular activities (during entire sess.)		
* in seven subjects: education, math, science, Nepali, health, English, social studies			# in one of 3 packages: 1] Nepali/S.S./health 2] math/science 3] English		

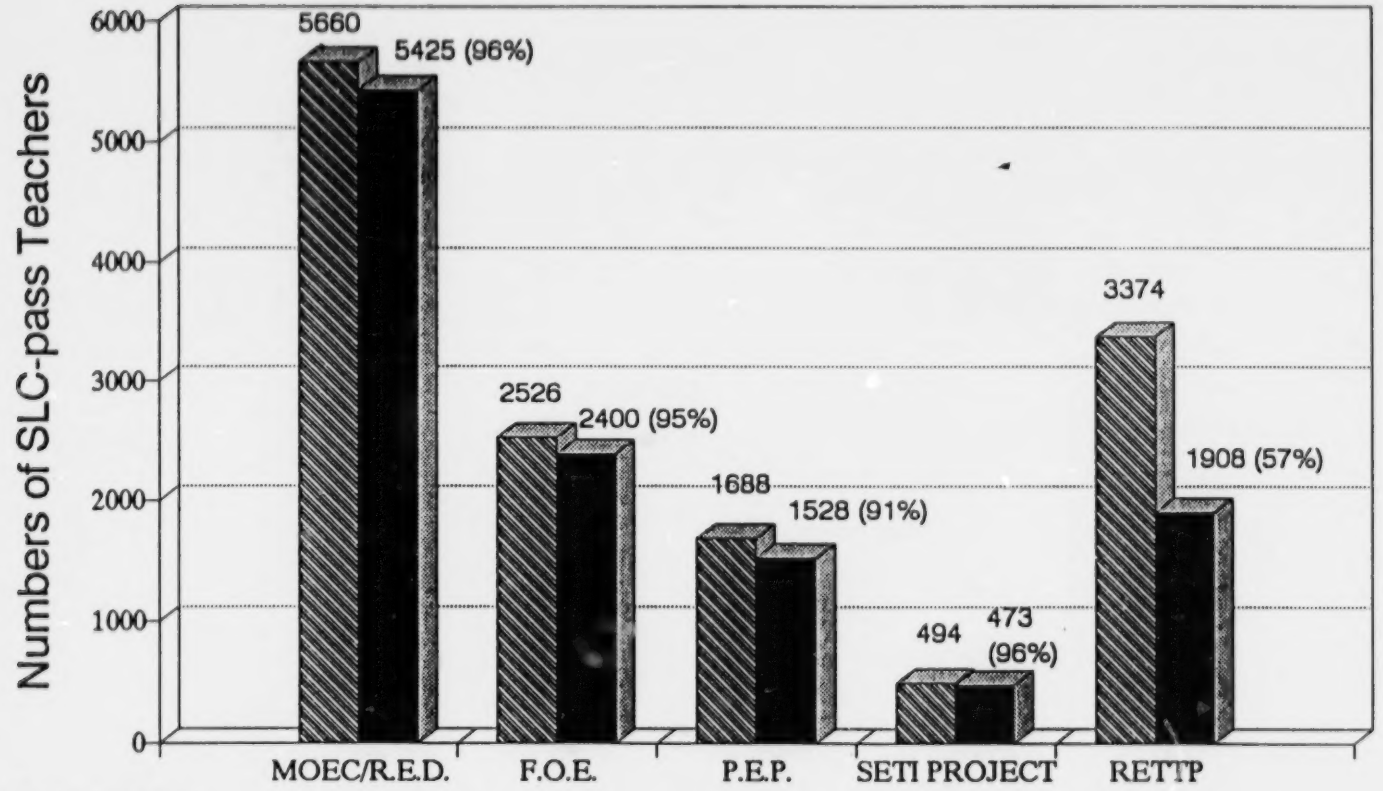
3.2 *Teacher enrollments*

If the Government of Nepal expects to enroll 80,000 teachers in its in-service training courses during the twelve years of the "Basic Needs for All Campaign," approximately 6667 teachers will have to be enrolled each year. In the first three years of the campaign a total of 13,742 teachers were enrolled for an average of 4581 per year. The Regional Education Directorates enrolled the largest number of teachers (5660), followed by the RETT Project (3374), in the first three years. The Faculty of Education enrolled 2526 teachers in its programs while the PEP and Seti Zone projects had 1688 and 494 teachers, respectively, in their courses (see Figure 3, below; also see Table O in the appendix).

3.3 *Completion and pass rates*

The completion rate for the RETTP courses may be defined as the percentage of teachers enrolled in the course who actually sat for the final examination. Those who did not take the exam are considered dropouts. The combined completion rate for three sessions of radio-based BTT was 83.4%, leaving a drop-out rate of 16.6% (see Figure 4, below). For the face-to-face courses, no data are available regarding the number of teachers who declined to attend the sessions or who dropped out prior to taking the final exam.

NO. OF TEACHERS ENROLLED & PASSED
B.T.T. COURSES RUN BY 5 AGENCIES*
(1987 - 1990)

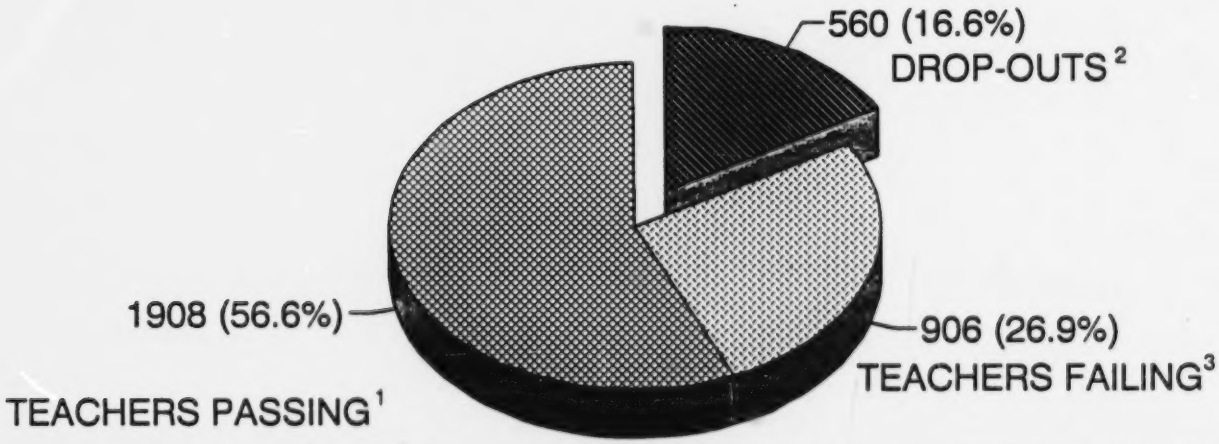


* The five agencies are:
MOEC/RED: Ministry of Education & Culture/
Regional Education Directorates
FOE: Faculty of Education, Tribhuvan University
PEP: Primary Education Project
SETI: Education for Rural Development, Seti Zone Project
RETTP: Radio Education Teacher Training Project

Figure 3

Figure 4

RETTP'S BASIC TEACHER TRAINING COURSE
Pass, fail, & dropout rates 1987-90



NUMBERS OF TEACHERS WHO PASSED, FAILED & DROPPED OUT (WITH PCT.)

1 Teachers passing: Teachers who achieved passing marks in all subjects on either first or subsequent attempts

2 Dropouts: Teachers who enrolled in the course but did not sit for the final exam-- all others are considered to have completed the course

3 Teachers failing: Teachers who took the final exam but failed (on first and any subsequent attempts) to achieve passing marks in all subjects

The pass rates for the radio-based BTT course and the face-to-face courses were markedly different (see Figure 3, above). Overall, during the three years of BTT, 56.6% of those enrolled in the radio courses earned BTT certification, whereas 94.8% of those enrolled in the four face-to-face versions did so. Annual pass rates for the radio courses were 68.1% for the first two sessions and 46.3% for the third. For the combined face-to-face courses, the annual figures were 100%, 89.7% and 98%, respectively.

Pass rates for the four face-to-face courses were uniformly (and suspiciously) high. The combined, three-year pass rate of the four agencies was over 90%. The lowest annual pass rate for any one agency was 82.6%, recorded by the PEP project in 1988-89. Yet, that same agency passed 100% of participating teachers in the course years immediately preceding and following 1988-89. As a result of differing pass rates, the RETT Project enrolled 32.5% of all participating teachers, but its graduates represented only 16.3% of those who eventually earned certification.

Whereas the face-to-face courses had a combined higher pass rate (98%) in 1989-90 than in the previous year (90%), the radio course's pass rate dropped from 68% to 46%. Although it does not fully explain differing trends over the three-year period, RETTP's record for 1989-90 must be considered in light of the dramatic, revolutionary political developments which took place in that year. The democratic movement which ended Nepal's absolute monarchy in April, 1990, severely disrupted everyday life through much of that year. Given the political situation, there may have been pressures to pass all teachers attending face-to-face sessions, so as not to alienate or arouse them. Why the percentage of teachers passing the radio course should have decreased rather than increased during the same period is not obvious. Daily listening patterns undoubtedly were affected by the political turmoil. The practical sessions were truncated due to budget cuts, and the training-of-trainers sessions were canceled altogether.

Why were the pass rates of teachers enrolled in face-to-face training courses so much higher than those enrolled in radio-based courses? One or more of the following factors may explain the discrepancy:

- *Logistical problems and competing personal demands handicapped radio course students.* Although the BTT course was nominally radio-based, data from teacher surveys and letters revealed that teachers actually relied more on the written, self-instructional materials (SIMs). Delays in the distribution of SIMs in each year of the project undoubtedly reduced many teachers' ability to keep up with the pace of instruction set by the radio lessons. Furthermore, the 5:30-6:00 p.m. broadcast slot for the radio lessons apparently conflicted with many teachers' home and family commitments;

- *the radio-based teacher training courses were more demanding than their face-to-face "equivalents."* Teachers enrolled in the BTT radio course received instruction, and were examined, in seven subjects, whereas their counterparts in the face-to-face course received "specialized" instruction in no more than four subjects at a time. Similarly, teachers attending the one-month, residential sessions benefitted disproportionately from the latter's intensity and level of personal attention;

- *BTT course participants were less motivated than their counterparts who received face-to-face instruction.* The nine-month duration of the radio course, compared to its month-long alternative, lowered the teachers' interest as well as their determination to keep on task;

and probably most importantly:

- *The BTT students were examined more rigorously and according to different standards than their peers in the face-to-face course.* There are strong endications that end-of-course exams administered to the two groups differed significantly in terms of their reliability, validity and degree of difficulty. There may also have been different standards applied in the grading of the two groups' exams.

  The lack of uniformity in the above areas was compounded by the fact that the radio-course exams were longer and were administered in two, three-hour sittings on successive days, while the face-to-face course exams were shorter and were administered in one sitting. The minimum passing score was 50% in both cases. However, radio course participants were required to answer 50% correctly of the questions on each section of the exam (thereby demonstrating proficiency across seven subjects), whereas their counterparts in the face-to-face courses only were required to answer correctly 50% of the *entire* set of questions, covering four of fewer subjects.

Additional research is required to determine which of the above factors contributed most to the striking gap in pass rates associated with the two teacher training courses. In fact, for purposes of future planning the MOEC has agreed to undertake a comparative cost-effectiveness study of the variety of Basic Teacher Training courses offered to date. When such a study is completed, new knowledge about the courses' operating procedures and success rates will become available.

3.4 *Learning gains*

Data were not available to compare the learning achieved by teachers enrolled in radio courses with those enrolled in the four face-to-face courses. The RETT Project did conduct a series of pre- and post-tests during the BTT's second (1988-89) session, although the evaluation effort was not extensive. No such study was undertaken of the MOEC's, or any of the face-to-face teacher training courses.

The results of the pre- and post-tests administered in 1988-89 are presented in Figure 5, below. They indicate that the average teacher participating in the radio course that year——the year prior to the implementation of the resource teacher system——raised his or her percentage of correct answers from 56.5% (142 out of 250) on the pre-test to 67.3% (168 out of 250) on the post-test. As stated previously, the tests were based on the BTT curriculum and covered seven subjects, with 50 points each assigned to Nepali, math and English, and 25 points each to education, science, health and social studies (the weights

approximated the weight of each subject in the curriculum), for a total of 250 points. Teachers improved in every subject, with the most improvement being made in education (53.2% to 70.7%), and the least improvement coming in social studies (54.3% to 60.8%). The highest mean scores on both the pre- and post-tests were in math, and the lowest means on both tests were in English. An increase of 8.6% on the English portion of the test still resulted in a post-test mean of 47%.[18] English was the only subject in which teachers failed to average 50%, the standard pass mark in Nepal (Research Centre for Educational Innovation and Development, & Ministry of Education & Culture, 1989).

One question frequently raised regarding the quality of the RETTP programs has been whether or not the teachers were able to comprehend the radio lessons. In other words, were presentation styles, vocabulary, actors' expression and recording quality such that teachers could understand lessons in the way intended by the course writers? Some doubt was expressed regarding this question in the Final Evaluation of RETT I (Butterworth, et al., 1983). Subsequent analysis of program scripts revealed that considerable inconsistency remained in the style and in the level of difficulty of vocabulary from one script to another in the Magazine Show portion of the program (Gurung & Holmes, 1983).

Clearly, if a radio-based course is to be effective, the lessons must be written and produced in a style, and at a level which is both attractive and appropriate to its principal audience. First and foremost, it must be comprehensible. The final evaluation of RETT II included a modest study to determine if the BTT lessons were being understood by listeners. It was based on the Sentence Verification Technique (SVT) for measuring reading and listening comprehension in developing countries (Greene, et al., 1990). The mean score on the listening comprehension test administered to twenty-eight teachers attending a contact session was 75%,

> indicating a good level of listening comprehension. The test provides some evidence that participants in RETTP's BTT course are able to understand what they hear on the radio. This is an important aspect of providing an effective instructional program. (Anzalone & Mathema, 1989)

The broadcast of lessons which are well-written and produced, does not, of course, guarantee that participants will increase their knowledge of the subject matter being taught. Transmission must be of good quality, the radios must be working properly, and teachers must listen regularly to the programs and read the accompanying SIMs lessons as well. Nevertheless, the finding that radio lessons, as produced by RETTP staff, were successful in communicating messages to the listeners indicates that the requisite quality level was met, and that teachers who did keep up with the course learned from it.

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[18] The results in English were somewhat higher than the scores teachers made in the second year of Radio Tuition. (Of course, the courses and tests were quite different, and not directly comparable.) In Radio Tuition, 215 participants improved from 37.2% on the pre-test to 43.0% on the post-test. This difference was significant at $p < .05$.

PRE- & POST-TEST MEAN SCORES (%)
RETTP'S B.T.T. (1988-89)

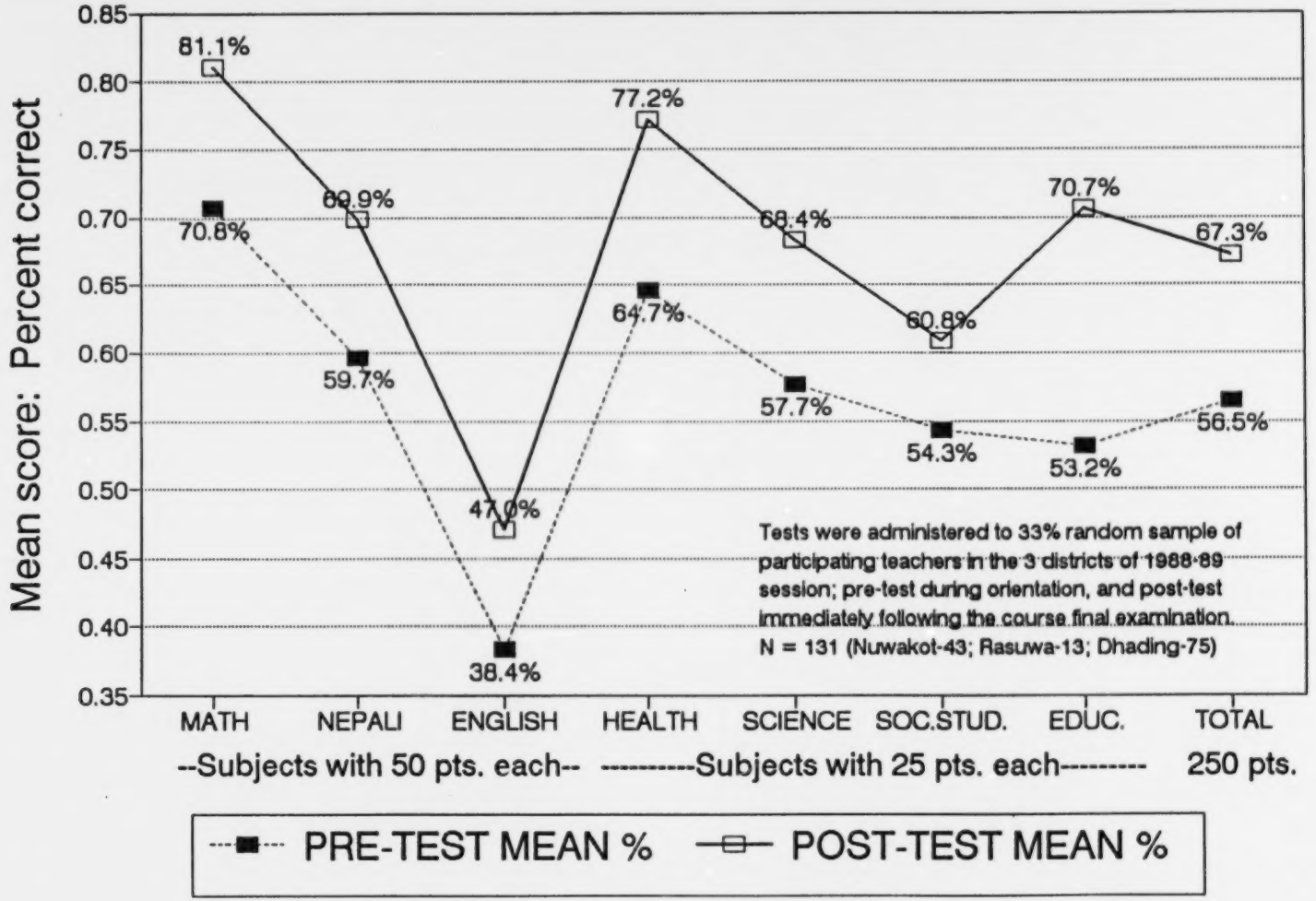

Figure 5

3.5 *Attitude and behavior changes*

Most of the data on the RETTP BTT course were collected during the 1988-89 session, when the distribution of both SIMs and radios was late, and the conducting of contact sessions was limited due to the fact that the resource teacher system was not approved until near the end of the course.

Teachers were provided with a set of pre-addressed and stamped aerogrammes, with questionnaires printed on them.[19] They were asked to fill out and send in one of these aerogrammes twice each month for the duration of the course. These aerogrammes, along with a set of questionnaires administered during the practical sessions held in the last month of the course, provided the data on which some assessment could be made of teachers' attitudes towards the course and the usefulness of what they were being taught. About half (47%) of the participants responded, with the average teacher sending in five aerogrammes. Teachers were asked to answer the following two questions:

(1) In the last two weeks have you tried to implement any of the things you learned from the lessons?

(2) If you have tried to implement anything from the lessons, please list the subject and the teaching method or activity you tried.

Eighty-three percent of the teachers responding to the above questions reported having tried to implement new knowledge or ideas in their classrooms. More than half of these mentioned specific teaching practices, including the use of concrete objects for teaching concepts in math and science, practical instruction in personal hygiene and the use of maps and charts in social studies. About half of the respondents listed difficulties they had faced as well. These ranged from the lack of basic materials in the schools, safe storage for items once constructed, and poor student response to innovations. Sixty-nine percent of the respondents did write, however, that they felt their efforts had had some positive impact in the classroom. Many of them were impressed by improved student responses to alternative questioning techniques.

Of course, these responses were all provided by the teachers, with no opportunity to monitor actual teacher or student behavior. Furthermore, only half of the participants made the effort to respond using the aerogrammes. It is therefore not possible to draw any definitive conclusions regarding the extent to which teachers' attitudes or behaviors were affected by participation in the BTT course. The findings of the aerogramme survey together with those of the end-of-course questionnaire survey are cause for cautious optimism, however. Teachers' responses to the final questionnaire indicated that the BTT course contributed to their mastery of all required subjects as well as to their ability and willingness to improve the teaching/learning environment of their schools.

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[19] These aerogrammes, too, were delivered late to many participating teachers.

Through community visits and letters from listeners, it was also discovered that teachers who were not enrolled in the course--both untrained and already trained teachers--were listening in large numbers. Members of this "shadow audience" stated that they were also able to add to or renew their knowledge as a result of listening to the BTT programs (Karmacharya & Khatri, 1989).

3.6 *Cost analyses*

In this section, the costs of radio-based and face-to-face teacher training courses are compared. In the case of face-to-face training, only the version of the Basic Teacher Training conducted by the Regional Education Directorates is examined. Of the four face-to-face programs, it had the most number of participants in the period covered by this study (1987-1990). It is also the one for which the most complete cost data were available. All inputs generating costs are identified for both programs, and assumptions of the study are stated. Recurrent costs are distinguished from capital costs, and variable costs are separated from fixed costs. The costs of training teachers via alternative strategies are then compared. Projections of the *per teacher* marginal costs (over the twelve-year period in which the BTT course is to continue) are given for different numbers of participants. For the radio-based course, the effect on marginal costs of shortening the duration of the sessions and of doubling their frequency are also calculated. Historical costs of the RETT Project are then presented, including the cost of foreign technical assistance provided to help develop the project.

Inputs which generate costs

The major categories of costs incurred by the government in the Basic Teacher Training course conducted by the Regional Education Directorates (RED) are as follows: (1) central administrative costs for office and staff of the MOEC's Teacher Training Unit, which is responsible for overseeing and coordinating the courses conducted by the RED; (2) site administrative costs borne at the directorates and training sites; (3) instructional materials; (4) support costs for teacher trainers; and (5) support costs for trainees. Additional categories of costs incurred are as follows: (6) expenses borne by participants during their month-long residence which are not covered by any allowances; and (7) the cost to the communities as a result of the teachers (and those teacher trainers who are high school teachers) being away from school for a month at a time, resulting in lost teaching time. (There is no provision in Nepal for substitute teachers.)

Central administrative costs include the salaries and benefits[20] for the staff of the Teacher Training Unit, along with the operating expenses of the office, and a "shadow price" for the "rent" of the office space, since the Ministry of Education & Culture building is

[20] For all employees (whether of the government, schools or university) it has been assumed that fifty percent, as permanent employees, receive both salary and benefits, while the other fifty percent, as temporary employees, receive only salary.

owned by the government.[21] It has been assumed that the Teacher Training Unit allocates 45% of its effort to this particular face-to-face course. Site administrative costs include payments made to site coordinators at both the training-of-trainers and teacher training locations, along with shadow price rents for the rooms used for all sessions. Instructional materials include printed handouts and some teaching materials utilized during the sessions.

Support costs for teacher trainers include salary and benefits, travel costs and daily allowances paid to Faculty of Education professors, district supervisors and high school teachers during both the training-of-trainers and teacher training sessions. For the trainees, the support costs provided by government include the travel allowance (Rs. 100 on the average) and daily "tea allowance" (Rs. 3.50/day on the average--enough for three cups of tea) provided to the trainees during the month-long sessions. The participant teachers must absorb the difference between the daily tea allowance (Rs. 3.50) and the estimated daily cost of room and board (Rs. 35); this has been termed subsistence costs borne by the trainees. The teachers' salaries and benefits are listed under lost teaching time and, as such, a cost to the community.[22]

There is one further category of costs which, though not included in the calculations, must be considered in this analysis. That is the "foregone opportunities" experienced by the participants each day they are required to be away from home. In economic terms, the time outside of school hours has equal utility for the teachers as the salary-earning time during school. Teachers use such time for a variety of productive and/or leisure activities (see e.g., Klees & Wells, 1978). For most Nepalese teachers, discretionary time is spent in household or farming activities as well as in income-earning work such as private tutoring or running a shop. Regardless of which activity they choose to engage in, the time does have value to the individuals, and they necessarily lose at least some of their discretion over how to use their time when they are away from home attending a training course (either as trainers or trainees). Assuming just twelve hours of "discretionary time" per day--and ascribing the other twelve hours to "non-discretionary" tasks such as eating and sleeping--each primary teacher attending a thirty-day training course would have to forego opportunities amounting to 236 hours (see discussion in section on comparison of costs, below).

The major categories of costs incurred by the government in the radio-based program conducted by the Radio Education Teacher Training Project are as follows: (1) administrative and staff support for the project office and its 45-member staff; (2) construction of the office complex; (3) construction and use of the recording studio; (4) production and distribution of the Self-instructional Materials (SIMs) books; (5) fees paid to Radio Nepal for air time; (6) subsidies provided teachers purchasing project radios; and (7) the cost of field activities

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[21] The detailed calculations of the cost of each of these items are given in Tables D through F of the appendix, and summarized in Table L.

[22] Since the government pays 100% of primary school teacher salaries and benefits, it would have been conventional to include the teachers' salaries (which continue to be paid to them throughout the training period) under costs of the training borne by the government. Here, however, this amount has been listed as a cost to the *community*, since it was felt that the absence of the teachers from their classrooms for thirty days represented a significant cost to the communities--schools and students--which should be costed.

including all supervision, orientations, training-of-trainers and contact sessions. Costs borne by the participant teachers are: the purchase price of (8) a radio and (9) the batteries to power the radio; and (10) the expenses incurred while traveling to and from orientation and practical sessions. The final category is (11) the cost to the communities due to lost teaching time during the approximate six days of school missed while attending course activities.

Administrative and staff support for the RETT Project include salaries and benefits for the 45 persons who are emplcyed there, in addition to the operating expenses including stationery, supplies, maintenance, utilities and vehicle operating costs.[23] It has been assumed that 75% of the project's effort was required to conduct all of the activities which make up the cycle of production, evaluation, transmission and examination.[24] The cost of the construction of the RETT Project office complex--excluding the recording studio--which was undertaken in two phases, is figured in the second category. The costs of constructing and equipping the recording studio comprise the third category, along with the costs generated by the recording of lessons (artists, recording tape, etc.). The cost of SIMs includes the printing and distribution of the books.

The Ministry of Education & Culture must pay Radio Nepal, which falls under the Ministry of Communications, a significant amount for the transmission of the programs. The required Rs. 750,000 (nearly $27,000) per year represents almost 25% of RETTP's annual budget, and approximately 8% of the total cost of providing the radio-based teacher training course. Although this can be characterized as 'one hand of the government giving money to the other,' it must be included as a cost of the program. That same air time could be allocated to another program, or Radio Nepal could be shut down during that time (as it is during other hours of the day). The point being that an opportunity cost is involved: The government could utilize those resources for *any* activity. By choosing to spend them on the radio-based teacher training program it makes those resources unavailable for any other activity which might also be desirable. Thus, the entire amount paid Radio Nepal for the air time has been included in the costs calculations.

Radios were sold to teachers in 1988 at a price (Rs. 700) approximately 12½% below the actual cost of purchase and delivery. The difference (about Rs.100) is considered a subsidy provided teachers by the government.[25] Teachers paid the purchase price of the

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[23] The itemized costs for the RETTP BTT course are given in Table G of the appendix. Detailed calculations of practical session costs are in Tables A through C. Overall course costs are summarized in Table M.

[24] The remaining 25% is estimated to have been spent on other activities, including development of future programs.

[25] According to the RETT II Project grant agreement, USAID would purchase the radios, which would be sold to the teachers. These funds were to be placed in a revolving fund, from which additional radios would be purchased for new groups of teachers. Thus it would be justifiable to list USAID's original radio purchase as a capital cost, which could be amortized over the life of the project. Recurrent costs would be the difference between the price of new radios and the amount collected for the old ones. This would result in a lower cost calculation for the course--the teachers would of course pay the same amount, but government revenues would offset this, reducing overall costs. It was decided to list the entire cost of the radio, however, primarily because it is not clear how this system is working in practice.

radio, and had to buy an estimated eight sets of four batteries each over the nine months of the course.[26]

The additional cost incurred by teachers is that for room and board during their travel (on foot) to and from practical session and orientation sites. RETTP paid a daily allowance (Rs. 35/day) during such sessions to cover the costs of room and board. This is reflected in the "field activities" costs borne by government. As with the face-to-face training, the time spent out of the classroom is assigned to the category of lost teaching time, as a cost to the community.

The category of "foregone opportunity costs" incurred by the participants is as important in relation to the radio-based course as with the face-to-face course. The nature of these costs are distinctly different, however. As mentioned above, the opportunities foregone by participant teachers in the face-to-face course result from the fact that they must spend about one month away from home, during which time they lose discretionary authority over how they use approximately 236 hours of out-of-school time. Teachers participating in the radio-based course forego approximately 498 hours of discretionary time (spread out over nine months) assuming they participate in all course activities. This includes time spent attending and traveling to and from the orientation, practical session, and final examination, as well as monthly contact sessions. It also includes time spent listening to the radio, studying the SIMs, and filling out the answer-back aerogrammes. These foregone opportunity costs have not been monetized in this cost study, though it is important to consider the implications of them in the comparative analysis. (See Tables A, B, and G in the appendix.)

The cost structure of both teacher training programs (at the level of 3000 enrolled per year) is shown in Figure 6, below. The relative share of each cost category is shown in this pie graph. The largest single category in the radio-based course is the cost of the radio to the teacher (about 22%).[27] If all costs associated with the use of radio are combined (air time, studio construction and recording, radio purchase price and subsidy, and batteries) the total comes to 44% of the overall marginal costs. The next most costly category is that of lost teaching time (about 18%), followed by the field activities (13%). For the face-to-face course, the largest components are the costs ascribed to lost teaching time (for both trainees

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Similarly, the foregone revenue to the government resulting from the fact that USAID purchased the radio on a duty-free basis has not been calculated as a cost of the program, on the assumption that the teachers would not have purchased the radio except for the purpose of participating in the teacher training course.

[26] The batteries available in rural markets are expensive and of notoriously poor quality. Although the batteries might last considerably longer if used only for the three hours each week of RETTP broadcasts--thus reducing the cost estimate--this seems to be a meaningless argument. The teachers purchased the radio to be able to participate in the training program and to tune in to other programs during the day.

[27] Of course including the full purchase price might imply that the radio has no further utility once the training course is completed, which is not the case. However, the assumption has been made already that the teachers would not have purchased the radio were they not enrolled in the course. In order to be consistent, the full price of the unit has been included.

and those trainers who are high school teachers), which amounts to 43% of the estimated per teacher marginal cost of the program, and the subsistence costs borne by the trainees while in residence at the session, which represents 29% of the overall costs. Of the governmental budgetary costs, the largest proportion goes for supporting the teacher trainers (salary, benefits, allowances and travel).

If the foregone opportunities of the participants were monetized at the average hourly teacher salary, this category would be the largest item in both training courses. It would increase the per teacher cost of the radio-based course by 172%, and of the face-to-face course by 73%.

Sources of support: Government, teachers & communities

The most notable feature of the comparative marginal costs of the two programs is how similar they are. At the levels of participation realized in 1988-89--approximately 2000 for the radio-based course and 3000 for face-to-face instruction--the per teacher marginal costs are virtually identical, at Rs. 3600 for the former and Rs. 3535 for the latter. Referring to Figure 5, above, it can be seen that the relative burden of costs borne by government, teachers and communities shifts considerably from one program to the next. The community bears 43% of the cost of training teachers in the face-to-face format, due to the participants missing a full month of teaching duties (and no substitute system being available); while the community bears just 18% of the radio course costs because teachers miss only six days of classes. The teachers' share increases somewhat for the radio version (33% as opposed to 29% for the face-to-face course), whereas the government's share rises substantially (49% of the radio course costs vs. 28% of face-to-face costs).

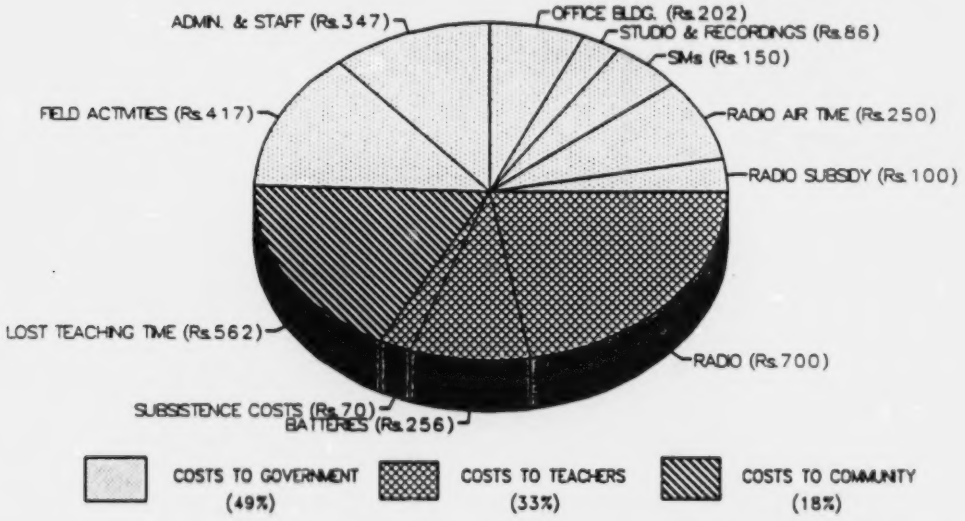
In sum, the radio-based training is more expensive for the government, and much less demanding on the communities. The face-to-face training is less expensive for the government and more demanding on the communities. For the teachers, there is not much of a difference in terms of *how much* they have to pay. There is, however, a considerable difference in terms of *what* they must pay *for*. Teachers attending a month-long, face-to-face course have to pay an estimated Rs. 1008 for their room and board requirements; those enrolled in the radio-based course pay Rs. 700 for a radio, Rs. 256 for batteries, and Rs. 70 for room and board during travel to and from the practical session, for a total of Rs. 1026. Since the radio will have value to the teachers for some time after the nine-month course, and since the estimate for batteries allows for their listening to other programs, it may be assumed that the teachers would prefer the cost structure of the radio course (excluding other aspects of either mode of training).

Figure 6

HOW INPUT COSTS ARE SHARED AMONG TEACHERS, COMMUNITIES & GOVERNMENT IN RADIO-BASED & FACE-TO-FACE B.T.T. COURSES

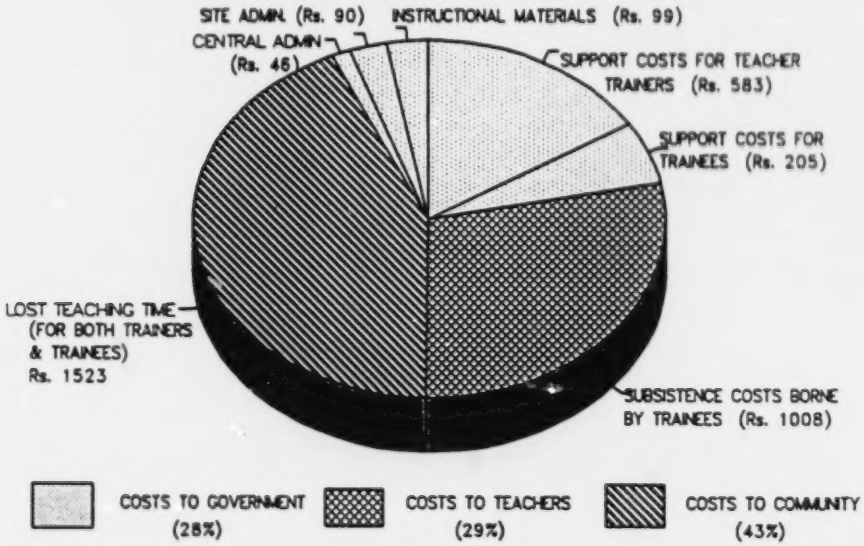
RADIO-BASED COURSE (3000 ENROLLED)

Cost per teacher: Rs. 3141



FACE-TO-FACE COURSE (3000 ENROLLED)

Cost per teacher: Rs. 3534


SITE ADMIN. (Rs. 90)
INSTRUCTIONAL MATERIALS (Rs. 99)
CENTRAL ADMIN (Rs. 46)
SUPPORT COSTS FOR TEACHER TRAINERS (Rs. 583)
SUPPORT COSTS FOR TRAINEES (Rs. 205)
LOST TEACHING TIME (FOR BOTH TRAINERS & TRAINEES) Rs. 1523
SUBSISTENCE COSTS BORNE BY TRAINEES (Rs. 1008)
COSTS TO GOVERNMENT (28%)
COSTS TO TEACHERS (29%)
COSTS TO COMMUNITY (43%)

All costs are in 1988 rupees; Rs. 28 = U.S. $1.00

Capital costs and recurrent costs

The average cost of training teachers using both radio-based and face-to-face modes has been calculated based on 1988-89 cost data. The complete cost sheets may found in tables L, M and N in the appendix. The recurrent costs were calculated using the available information regarding the actual costs incurred and modalities of the courses as they were structured at the time, and as discussed in earlier sections of this study. Recurrent costs include all annual activities (contact sessions, training of trainers, etc.) and encumberments (salaries, air time, etc.), as well as goods which must be replaced within a year or two. Capital costs are for those goods which last for more than a year or two. The major capital items are buildings and, in the case of the RETT Project, studio equipment and the cost of producing the original 480 Basic Teacher Training lessons.[28]

All of the costs for building space utilized by and for the face-to-face training courses——both in the field at the training sites, and at MOEC and the university--have been represented as "shadow prices" or rents--at an assumed price of Rs. 1000 per month per room. Temporary facilities used for field activities of the radio-based course have been valued at the same rate.[29] The construction costs for the RETT Project office complex in Sano Thimi, including the sound studios, recording equipment, and cost of producing the original 480 lessons, were converted to 1988 rupees, and amortized over their assumed life——twenty-five years for the building and studios; twelve years for the recorded lessons——at a discount rate of 10% per annum.[30]

Fixed costs and variable costs

Fixed costs are those which do not vary with the number of participants in the program, such as salaries of permanent staff, all capital costs, etc., whereas variable costs are those which increase or decrease as the number of teachers enrolled rises or falls. All costs borne by teachers and communities in both teacher training programs are variable: They are incurred by every teacher who participates, and by none who does not. Only the government costs can be fixed. A significant portion of the radio course costs are fixed; altogether they represented 38% of the per teacher average cost (at the 2000 enrollment level), and would represent 29% of the costs if 3000 teachers were enrolled. These fixed costs include the salaries, benefits and support (supplies, utilities, maintenance, etc.) for the office staff, capital costs of the building and studios, radio air time, and certain aspects of the

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[28] Production costs include remuneration to musicians and actors and the cost of recording tape.

[29] Some of the training sessions are held at schools or campuses during vacation or other "slack time," or in government buildings which may otherwise have been idle. In the absence of specific information, however, costs have been assigned to all room usage.

[30] Although the assigned "shadow price" of Rs. 1000 ($36) per room per month (which was applied to the use of all training sites and offices) may sound high in the Nepalese context (at 1988 prices), it should be noted that the monthly cost of each room (excluding recording studios) at the RETT Project office is Rs. 2294 ($82). The higher cost of the latter reflects the high standard of construction of the building.

final examination and field supervision systems which are fixed in nature. A very small portion of the face-to-face course costs are fixed. They are comprised mainly of office space, staff and support for the Teacher Training Unit, and represent only about 1% of the average per teacher costs of the program.

Because of the large difference in the ratio of fixed to variable costs in the two programs, the radio-based course becomes progressively less expensive on a *per teacher* basis as enrollment levels increase, whereas the per teacher costs for the face-to-face are virtually constant at all enrollment levels. Figure 7 shows the portion of variable and fixed costs for both types of courses.

"Fixed costs" can also change, of course, if basic tenets of the program are altered. For example, the RETT Project leadership had sought to reach agreement with Radio Nepal for an hourly time slot (rather than the 30-minute slot which they got), so that two sessions could be conducted each year rather than one. (This was in response to significant pressure brougth to bear by teachers and ministry officials who felt strongly that the nine months duration of the course was too long, and that it could easily be reduced by doubling the daily broadcast time to one hour.) Since the annual cost of air time would double in relation to other fixed costs such as staff salaries and office space, the "mix" of fixed cost inputs would look different. The project has assumed that having two sessions per year would reduce per unit costs significantly. This would only be true, however, if the annual enrollment could be increased significantly. For example, if enrollments were increased from 3000 teachers in a single session to a total of 6000 teachers in two sessions, then the per teacher cost would decrease by about 10%, from Rs. 3158 to Rs. 2830. (This may be seen in Figure 7.) Fixed costs would be reduced in this case to 21% of marginal costs. (Cost data and assumptions regarding the two-sessions-per-year model may be found in Table N in the appendix.)

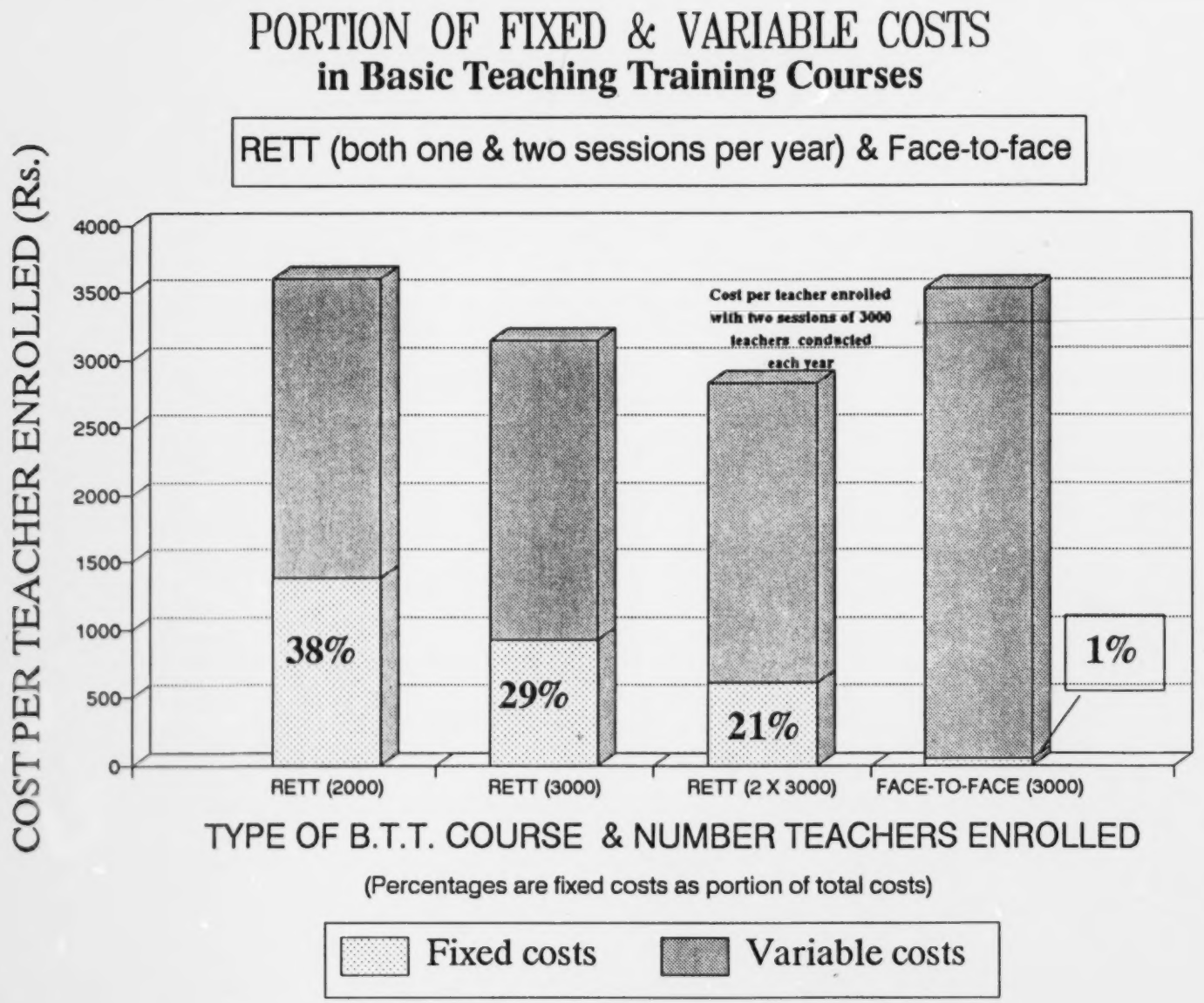
PORTION OF FIXED & VARIABLE COSTS
in Basic Teaching Training Courses
RETT (both one & two sessions per year) & Face-to-face
COST PER TEACHER ENROLLED (Rs.)
4000
3500
3000
2500
2000
1500
1000
500
0
Cost per teacher enrolled with two sessions of 3000 teachers conducted each year
38%
29%
21%
1%
RETT (2000)
RETT (3000)
RETT (2 X 3000)
FACE-TO-FACE (3000)
TYPE OF B.T.T. COURSE & NUMBER TEACHERS ENROLLED
(Percentages are fixed costs as portion of total costs)
Fixed costs
Variable costs

Figure 7

How much does it cost to train teachers via radio-based and face-to-face BTT courses?

The projected *per teacher* marginal costs for conducting the Basic Teacher Training by radio-based and face-to-face modes are given in table no. 5, below. In the case of the RETTP courses, figures are given for both one and two sessions per year (implications of this were discussed in the section on fixed and variable costs (5.4), above). It can be seen from this table that, taking into account the assumptions made in this study, the face-to-face method of teacher training is less expensive than the radio-based method at enrollment levels up to 2000; and that the radio-based method is less expensive at levels of 3000 and higher.

The data used for this cost analysis were from the 1988-89 fiscal year. The RETTP radio-based course had 1585 participants that year, and the MOEC/Regional Education Directorate's face-to-face courses had 2583 participants. Projections have been made for other levels of enrollment based on those data, with adjustments for anticipated needs which would come with larger-scale implementation.[31] Yet, large increases in the number of participants are likely to change the way any instructional delivery system operates. This is one reason why such projections must always be treated with caution.

The original goal of enrolling 5000 teachers per year was never achieved by the RETT Project in its first twelve years. The most teachers enrolled in any one year was 1934 in 1982-83, in the course for under-SLC teachers. Since the inception of the BTT course in 1987, project leaders hoped to enroll up to 3000 teachers per year. Ministry officials preferred waiting until the system was established and in place before expanding to numbers of that magnitude. In any case, the RETT Project has yet to prove that it can successfully administer a training course for more than 2000 participants. At what level of enrollment would the project staff itself have to be increased significantly, thus raising fixed costs? This is an empirical question which cannot yet be answered.

It is this type of issue which is crucial to a consideration of whether it is advantageous to broadcast two sessions per year instead of one. At *equivalent* levels of enrollment, it is advantageous from a cost perspective to conduct one, and not two sessions per year. This is so, of course, because fixed costs such as radio air time are also doubled when the additional session is run. The question is really, therefore, what is the maximum number of teachers which the RETTP BTT system can manage without overextending its logistical capacity and reducing the effectiveness of the course? If it is, for example, 3000, and 4000 (or more) teachers need to be trained, then the cost-effective decision would be to conduct two sessions of 2000 teachers each.

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[31] For example, it was assumed that the radio-based course would continue to operate in six districts at a time at enrollments up to 2000, but that more districts would be participating at higher levels. The support for field supervision and monitoring (treated as fixed costs) was adjusted accordingly. Similarly, when making projections for conducting two RETTP sessions per year, it was assumed that additional non-professional staff would be hired due to the additional logistics involved.

Table 5

AVERAGE COST (PER TEACHER) OF BASIC TEACHER TRAINING COURSES AT VARIOUS ENROLLMENT LEVELS
(In 1988 Rupees, Rs.28 = U.S.$1.00)

Type of BTT course	Number of teachers enrolled per year:					
	1000	2000	3000	4000	5000	6000
Radio-based BTT (1 session per year)	Rs.4,979	Rs.3,600	Rs.3,158	Rs.2,911	Rs.2,803	Rs.2,706
Radio-based BTT (2 sessions per year)	Rs.5,873	Rs.4,047	Rs.3,439	Rs.3,134	Rs.2,952	Rs.2,830
Face-to-face BTT (MOEC/RED)	Rs.3,628	Rs.3,558	Rs.3,534	Rs.3,523	Rs.3,516	Rs.3,511

The cost analysis thus far has been of marginal costs for alternative methods of teacher training. It assumes that the delivery systems and infrastructure are already in place. The capital costs of items such as the buildings, recording studios, etc. are included. Yet, such systems are not created within a short time span. The MOEC could launch, on very short notice, a large-scale face-to-face teacher training campaign only because the Faculty of Education and the MOEC's line agencies at the regional and district levels had large numbers of professional educators (requiring large sums of capital investment) and considerable institutional experience at their disposal. Similarly, the RETT Project was able to develop and produce its BTT course within a six month period because it, too, had by that time developed into a mature institution. How much of the "historical costs" of that institutional development to ascribe to the launching of any one program such as BTT is an impossible question. Yet those costs cannot be ignored. It is for this reason that the total costs of the RETT Project (1978-90) are presented in the next section.

Historical costs of the RETT Project

The analysis and discussion of costs thus far has dealt primarily with the subject of *marginal costs*. It assumes that the institutional structures for conducting Basic Teacher Training courses, whether via a radio-based technology or via a more traditional, face-to-face format have been developed and are in place. The costs of administering these programs for the next twelve years--for the duration of the "Basic Needs" campaign--are *marginal* costs, i.e., the costs generated by each additional teacher enrolled (in terms of variable costs), or session conducted (in terms of fixed costs). Development costs are reflected in this analysis to the extent that the annualized costs of capital items such as buildings and recording equipment have been included. Yet this does not give any indication of what might be termed the "historical costs" involved in the development of the relevant institutions. Historical costs

are more significant in relation to innovative educational technology projects such as Nepal's RETTP than they are to alternative face-to-face training programs. "What is the start-up time of a radio-based, distance education teacher training system?" is a vital question for educational administrators and planners who are considering alternative approaches. So many factors are involved, however, that it is extremely difficult to arrive at a definitive answer. What is the entry-level of readiness of the staff who will be hired or deputed to the new project? Is expertise in scriptwriting, educational radio production, etc. available locally, or will foreign technical assistance be required? Does the country have a national radio transmission capacity at present, or will new broadcasting equipment have to be purchased? And what about recording facilities? Where will the distance education program be situated in the ministerial or university hierarchy? How much autonomy will it have? These are some of the questions whose answers will have great bearing on the final answer to the questions "How long will it take?" and "How much will it cost?" So much depends on unique, contextual variables, making it impossible to generalize, and risky to extrapolate from the experience of one project to another.[32]

Two tables are presented below which will help to clarify the nature of the investment which was made in the Radio Education Teacher Training Project during the period 1978 - 1990. Table 6 gives the breakdown of both budgeted and expended funds during the second phase of the project, showing the respective amounts for each funding source, USAID and His Majesty's Government of Nepal. Of these categories, the local support costs, building construction and some of the commodities have been included in the cost analysis of marginal costs. Technical assistance, training, and external evaluation have not been included.

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[32] For example, a significant portion of USAID expenditure on commodities during both phase I and II of the RETT Project went to Radio Nepal for the purchase of a 100,000 watt short-wave transmitter and antenna, as well as lots of ancillary equipment. Yet it was not until Radio Nepal's *medium-wave* capacity was expanded (using other sources) that the RETT programs benefitted from quality transmissions. Should the RETT project costs be considered in an analysis of "development costs" or not? There are many such questions in the twelve-year life of a project.

Table 6 HISTORICAL EXPENDITURES FOR RETT II PROJECT (1984 - 1990) BY USAID & HIS MAJESTY'S GOVERNMENT, BY BUDGET CATEGORY, IN CURRENT DOLLARS, WITH TOTALS ALSO IN CONSTANT (1988) DOLLARS[a]

BUDGET CATEGORY	USAID BUDGET[b]	USAID EXPENDITURE	HMG BUDGET[b]	HMG EXPENDITURE
Technical assistance[c]	604,400	794,554		
Training[d]	421,000	233,996		
Evaluation (external)[e]	55,600	32,571		
Local support costs[f]	250,000	225,703	234,099	415,598
Commodities[g]	435,000	510,992		
Building construction[h]	-	175,410		
Contingency/inflation[i]	353,700	-		
TOTAL	$2,119,700	$1,973,226	$234,099	$415,598
(In 1988 U.S. dollars)	$2,256,875	$2,100,921	$249,249	$442,493

a Data based on USAID/Nepal accounts as of 4/30/90, with estimates by the authors of additional expenditures incurred prior to 9/30/90 end of RETT II Project.

(Figures have been left in *current dollars* (unadjusted for inflation) in this table, so that they may look 'familiar' to those who have been associated with the project). The totals are given in both current and constant dollars.

b Budget data are from RETT II Project Paper (USAID, 1984).

c Includes two long-term expatriate advisors for a total of 84 months, two long-term Nepalese advisors for a total of 42 months, and ten months of short-term expatriate technical assistance.

d Includes in-country and third country short-term training for RETTP and Radio Nepal personnel, three master's degree programs for RETTP staff and one for CERID staff, in the U.S.

e Midterm evaluation (1986) and final external evaluation (1988).

f This item represents the entire budget for the RETT Project as per the HMG/MOEC approved annual budget and workplan. The HMG portion represents the normal operating budget for the project, including transmission of programs, salaries and benefits, travel, utilities, stationery, maintenance, etc. The USAID portion supports printing of SIMs, and added costs incurred due to research and evaluation activities and program development costs, e.g. actors' remunerations, support to DEOs, etc.

g This represents commodities for both RETTP project (new equipment and spare parts for recording studio, one all terrain vehicle, three motorcycles, photocopying and typing equipment, a computer, a VCR and camera, etc.) and Radio Nepal.

h $130,000 represents cost of construction of the 22-room new wing of the RETTP offices; remainder represents additional construction of a second studio (for future projects) and landscaping costs. Only the former has been included in annualized capital costs in recurrent cost analysis.

i This budget allocation was applied primarily to the office construction, as well as additional technical assistance.

The same is true for the data in the next table, below, which shows the historical costs for *both* phases of USAID assistance. Some of the categories are not comparable across project phases; this has been explained in the footnotes. It can be seen from this table that the first phase of the project was about two and a half times more expensive than the second phase, primarily due to the much larger commitment of technical assistance and expenditures on commodities amounting to nearly 42% of the total project cost. Certainly RETT II built upon the foundation which was begun during RETT I; yet it would be impossible to determine to what extent any portion of RETT I costs may have been "necessary and prerequisite" to RETT II. For example, only six of the more than

twenty project staff who received overseas training under RETT I were still with the project during the second phase. For the same reason of staff attrition, much of the on-the-job training given by foreign advisors during RETT I may not have directly benefitted those working on RETT II. And the frequent changes in project leadership and location which characterized the first nine years of the project's history most certainly resulted in a less-than-efficient development. Yet it would be erring on the other side to assume that a new radio education project starting up now could benefit from these "lessons learned" and progress through the initial stages without suffering from some of these "growing pains." To some extent, any new institution can and must be expected to pass through these types of difficulties.

Table 7

HISTORICAL EXPENDITURES BY HIS MAJESTY'S GOVERNMENT & USAID FOR RADIO EDUCATION TEACHER TRAINING PROJECT DURING RETT I (1978-83), RETT II (1984-90) & TOTALS *IN CONSTANT (1988) U.S. DOLLARS*

BUDGET CATEGORY	RETT I	RETT II	TOTAL
Technical assistance[a]	2,158,869	845,973	3,004,842
Training[b]	222,432	249,139	471,571
Evaluation (external)	0[c]	34,679	34,679
Local support costs (USAID)[d]	353,304	240,310	593,613
Operating costs(HMG)[e]	878,639	442,493	1,321,132
Commodities[f]	2,676,584	544,060	3,220,644
Building construction[g]	109,032	186,762	295,793
Total expenditures (in *constant* 1988 $)	$6,398,860	$2,543,415	$8,942,275

[a] For RETT I, includes 123 person-months of long-term expatriate advisors, and 27 months of short-term technical assistance. For RETT II, includes two long-term expatriate advisors for a total of 84 months, two long-term Nepalese advisors for a total of 42 months, and ten months of short-term expatriate technical assistance.

[b] For RETT I, includes in-country, third country and U.S. training for 140 Nepalese associated with RETTP and Radio Nepal. Of these, four received long-term Master's training in the U.S. For RETT II, includes in-country and third country short-term training for RETTP and Radio Nepal personnel, three master's degree programs for RETTP staff and one for CERID staff, in the U.S.

[c] Cost of external, final evaluation was not accounted for separately in RETT I report. Thus, data not directly comparable with RETT II data.

[d] Rupee costs (project operating costs) have been separated by funding source, USAID and HMG: "Local support costs" represents USAID's share of the rupee costs, channeled through RETT Project and HMG procedures.

[e] This represents HMG share of RETTP operating budget. Figures for RETT I include the value of land donated to the project by the government, and salaries of district supervisors for their time on task, whereas for RETT II this line item includes only funds actually released to and spent by the RETT Project.

[f] Includes purchase of 2500 radios in RETT I and 4800 in RETT II; studio equipment, air conditioning and tapes for RETTP and a 100,000 watt shortwave transmitter and antenna, and additional equipment for Radio Nepal; three vehicles in RETT I and one in RETT II, along with three motorcycles; one each photocopy machine, computer, television, VCR and camera; etc.

[g] Value of land donated by HMG for RETTP has not been included here; its assessed value of $87,000 1980 dollars equals $157,000 1988 dollars.

One point which is evident from the Table 6 on RETT II costs, is that the Government of Nepal spent almost 78% more supporting project activities than it was obligated to according to the terms of the project grant agreement. This is strong evidence of the fact that RETTP did eventually mature into a fully institutionalized agency of the Ministry of Education & Culture, which is something many educational technology projects have been unable to achieve. This is discussed in more detail below.

4.0 CONCLUSIONS

In this section, we summarize major findings from our case study of Nepal's Radio Education Teacher Training Project by answering the following questions: (1) Is RETTP's Basic Teacher Training course educationally effective?; (2) Can Nepal afford the RETT Project?; and, drawing on the lessons learned from this study, (3) What are the prerequisites for success in radio-based, distance education teacher training projects?

Is RETTP's Basic Teacher Training course educationally effective?

Teachers participating in the 1988-89 session made overall gains of 12.3% in the seven subjects covered in the course, as measured by the pre-post series of tests. Letters from the field as well as responses to survey questions indicated that many--though not all--teachers tried to incorporate what they had learned from the lessons into their classroom teaching. Most were at least somewhat encouraged by the results of these initial innovations, although many cited obstacles to success as well. The overall completion rate of 83.4% is quite satisfactory for a distance education system of this type. The pass rate of 56.6% for teachers in the radio-based course is consistent with campus-based courses in Nepal of earlier years (prior to the launching of BTT). It is remarkable only in contrast to the 94.8% pass rate of the four face-to-face BTT courses.

More definitive answers to the question of how effective radio-based training courses are compared to face-to-face alternatives will have to await the results of the planned comparative cost/effectiveness study. Similarly, further study will be required to identify the causes of the vast difference in the pass rates of the two courses.

Although no definitive response can be given to the question "Is RETTP's BTT course educationally effective?," it can be said that there is no evidence to indicate that it is any *less* effective than the face-to-face alternatives.

Can Nepal afford the RETT Project?

Here, too, there is no definitive answer. The data do indicate that the course--as it is presently structured--would be less expensive on a per teacher, unit cost basis than the face-to-face alternative *if* upwards of 3000 teachers were to be enrolled and the course successfully managed. Although it has yet to be demonstrated that the RETT Project can conduct a session with that size of enrollment, there is no evident reason to suspect that it cannot. In the long run, however, it is

unlikely that the RETT Project will prove to be truly "affordable" (or cost-effective) if its role is limited to the present Basic Teacher Training course. Considerable capacity now exists in the RETT Project as a result of investments made in professional staff and expertise, buildings, studio equipment and outreach. Full utilization of such professional talent and infrastructure will only be realized when additional tasks are undertaken, be they in the field of teacher training or in other educational endeavors.

Prerequisites for success

It takes time.

The most notable indicator of the RETT Project's success is the degree to which it has been institutionalized within the Ministry of Education & Culture. This was the result of an evolutionary process. All three major, external evaluations of the USAID-assisted projects emphasized the inability to provide a stable "home" and stable leadership to the project as a major factor contributing to slower-than-desired progress in the years up to 1987. Since its founding in 1987, the project has had five institutional homes, nine project chiefs, and two phases of donor participation. Originally placed under the Dean of Education, Tribhuvan University, it was moved to the MOEC in 1979. Not long thereafter it was moved to the semi-autonomous Curriculum, Textbook & Supervision Development Centre of the MOEC where it remained until 1986. In that year the first concrete step towards the institutionalization of the project was taken: Twenty permanent civil service positions were created and the project was placed in the MOEC under the Educational Administration Division. A year later it was transferred to the newly-created Primary Education Division, which is responsible for administration of the Basic Needs for All Campaign within the ministry.

Since the end of RETT I, the project has operated, in so far as administrative and budgetary regulations and procedures are concerned, as a regular office of the government, without any of the special procedures often associated, at least in Nepal, with the term "project." (It survives as a "project" only in name——the name of the office never having been changed to "unit," "section," or "centre", as would befit a permanent office of the MOEC). Whereas this fact was often cited as a reason for slow decision-making and implementation of activities, it also seems to have paid off in terms of project longevity, as evidenced by its ability to build a constituency for itself within the government.

In addition to its hierarchical links within the MOEC, the project also has developed strong horizontal links with a number of agencies. Given the size of RETTP--forty-five persons on its current staff--it is perhaps unusually complex in terms of its institutional relationships. It works directly with the REDs and DEOs--the field agencies of the ministry--in terms of recruiting, enrolling, supervising and evaluating teachers. Its major decisions are made by the RETT Policy Committee, consisting of higher level MOEC officials, the Project Chief, and representatives from the National Planning Commission, the Ministry of Finance, and Radio Nepal. It is also dependent on Radio Nepal for the broadcasting of all of its programs. And, of course, it has benefitted greatly from the funding and technical direction provided by the Nepal Mission of USAID.

It is most noteworthy that His Majesty's Government contributed 78% more by way of direct

financial support to the project during RETT II than it was obligated to under the terms of the original project agreement (as seen in Table 5). Furthermore, HMG increased its support in 1990-91, as USAID assistance came to an end, and again in 1991-92. Given the extreme financial pressures experienced by Nepal at the time, this is solid evidence of the government's commitment to teacher training, and to RETTP's unique contributions. RETTP's experience is proof once again that successful projects are not "developed" overnight, or even within the typical five-year timespan of a donor-assisted program.

The project cannot develop more quickly than the infrastructure it depends on.

A distance education system cannot develop faster than a country's communications and educational infrastructure unless it is endowed with its own recording facilities and broadcasting network, along with its own staff to carry out monitoring and logistical activities in the field. It must work in coordination with other agencies in the country. Unquestionable, the RETT Project benefitted from the growth of Radio Nepal, and especially the expansion of its medium-wave transmitter network in the latter part of the 1980s. Earlier efforts to deliver its programs nationwide were largely ineffective due to the limited capacity of Radio Nepal at the time.

Project goals must be clear, and agreed upon by all parties.

It was only in 1987, with the mandate to begin training qualified (i.e., SLC-pass) teachers, that the RETT Project was able to contribute significantly to educational development in Nepal. Prior to that it suffered from an unclear mission, and struggled to develop programming for an audience of marginal importance.

Sustainability requires autonomy and flexibility.

Even if project goals are clear and agreed upon by all parties--as they were not always in the case of RETTP; and even if the project design incorporates adequate technical feasibility assessments--as was certainly not the case with RETT II; a radio-based distance education system still requires frequent policy renewal at the highest levels of government. The complexity of the undertaking and the fact that so many ministries and institutions are inevitably involved demand such attention. The higher the project is placed within the government hierarchy, and the greater the recognition enjoyed by its leaders, the greater will be its chances for success.

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Table A.

COSTS OF TRAINING OF TRAINERS SESSION

Session: 2 days
Travel: 2 x 2 days for RETT staff; 2 x 1 day for H.S. teachers (none for sprvsrs)
Trainers-of-trainers: 2 RETT staff
Trainees: 3 supervisors & H.S. teachers per every 150 enrolled teachers

							COSTS PER SESSION FOR THREE TRAINERS				COSTS PER TEACHER TRAINEE OF TRAINING TRAINERS			
PERSONNEL	ITEM	NO.		@ AMOUNT		UNIT	GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)	GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)
Trainers--														
RETT staff	per diem	2 staff	x	Rs.55	x	6 days	Rs.660			Rs.660	Rs.4			Rs.4
	travel	2 staff	x	Rs.1,000			Rs.2,000			Rs.2,000	Rs.13			Rs.13
	salary +													
Trainees--														
Supervisors	per diem	2 suprvsrs	x	Rs.55	x	2 days	Rs.220			Rs.220	Rs.1			Rs.1
	travel	2 suprvsrs	x	Rs.0			Rs.0			Rs.0	Rs.0			Rs.0
	salary	2 suprvsrs	x	Rs.86	x	2 days	Rs.172			Rs.172	Rs.1			
H.S. teachrs	per diem	1 HS tchrs	x	Rs.55	x	4 days	Rs.220			Rs.220	Rs.1			Rs.1
	travel	1 HS tchrs	x	Rs.170			Rs.170			Rs.170	Rs.1			Rs.1
	foregone opp.@	1 HS tchrs	x	*	x	24 hrs		0		Rs.0		Rs.0		Rs.0
	lost tchng ##	1 HS tchrs	x	Rs.19.60	x	24 hrs			Rs.470	Rs.470			Rs.3	Rs.3
NON-PERSONNEL														
Building	rent	1 room	x	Rs.1,000	x	0.07 mo.	Rs.67			Rs.67	Rs.0			Rs.0
Instrctnl materials	handouts	1 set	x	Rs.10	x	3 pers.	Rs.30			Rs.30	Rs.0			Rs.0
Total costs for training three trainers (for every 150 teachers)							Rs.3,539	Rs.0	Rs.470	Rs.4,009	Rs.23.59	Rs.0.00	Rs.3.14	Rs.25.58

+ Salary for RETT staff has been included under administrative costs of project.

@ Teachers have "foregone opportunities" to the extent they are away from their home and lose discretionary time which may have been used for remunerative work or non-remunerative leisure activities.

* No monetized value given to the trainers' foregone opportunity costs--though there are costs--resulting from spending 7 days away from home and loring full, free use of discretionary time outside of working hours. (Though it could arguably be valued at hourly wage rates.)

"Lost teaching" represents a monetized value for the instructional time not realized by students as a result of the teacher being away from school at training; it has been valued at the average teacher's wage. This cost is actually borne 100% by the government (for primary teachers) and 50% by government and 50% by student fees (for high school teachers--i.e., trainers). The total value of lost teaching time has been listed as "community cost" since the loss is to the schools.

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Table B.

COSTS OF RETT BTT 30-HOUR PRACTICAL SESSIONS FOR 150 TEACHERS
Session: 5 days X 6 hrs
Travel: 2 x 1 day
Trainers: 4 (2 supervisors + 1 H.S. teacher + 1 RETT staff member)
Trainees: 150 primary school teachers

PERSONNEL	ITEM	NO.	@ AMOUNT	UNIT	COSTS OF 30-HOUR PRACTICAL SESSION FOR 150 TEACHERS				COSTS OF PRACTICAL SESSION PER TRAINEE			
					GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)	GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)
Trainers--												
RETT staff	per diem	1 staff	x Rs.55 x	7 days	Rs.385			Rs.385	Rs.2.57			Rs.2.57
	travel	1 staff	x Rs.1,000		Rs.1,000			Rs.1,000	Rs.6.67			Rs.6.67
	salary +				+							
Supervisors	per diem	2 supervsrs	x Rs.55 x	5 days	Rs.550			Rs.550	Rs.3.67			Rs.3.67
	travel	2 supervsrs	x Rs.0		Rs.0			Rs.0	Rs.0.00			Rs.0.00
	salary	2 supervsrs	x Rs.0 x	5 days	Rs.0				Rs.5.75			Rs.5.75
H.S. teachrs	per diem	1 HS tchrs	x Rs.55 x	7 days	Rs.385			Rs.385	Rs.2.57			Rs.2.57
	travel	1 HS tchrs	x Rs.170		Rs.170			Rs.170	Rs.1.13			Rs.1.13
	foregone opp.@	1 HS tchrs	x *	50.5 hrs		Rs.0		Rs.0				Rs.0.00
	lost tchng ##	1 HS tchrs	x Rs.0.00	33.5 hrs			Rs.0	Rs.0			Rs.4.38	Rs.4.38
Trainees--									Rs.150.00			Rs.150.00
Prim. tchrs	per diem	150 tchrs	x Rs.30 x	5 days	Rs.22,500			Rs.22,500	Rs.0.00			Rs.0.00
	travel	150 tchrs	x Rs.0		Rs.0			Rs.0	Rs.25.00			Rs.25.00
	snack allwnc	150 tchrs	x Rs.5 x	5 days	Rs.3,750			Rs.3,750		Rs.0.00		Rs.0.00
	foregone opp.@	150 tchrs	x * x	55.5 hrs		Rs.0		Rs.0		Rs.70.00		Rs.70.00
	addt'l expnss#	150 tchrs	x Rs.35 x	2 days		Rs.10,500		Rs.10,500			Rs.309.94	Rs.309.94
	lost tchng ##	150 tchrs	x Rs.0.00 x	28.5 hrs			Rs.0	Rs.0				
NON-PERSONNEL									Rs.3.33	Rs.0.00	Rs.0.00	Rs.3.33
Building	rent	3 rooms	x Rs.1,000 x	0.17 mo.	Rs.500			500				
Instrctnl materials		1 set	x 25 x	150 tchrs	Rs.3,750				Rs.25.00	Rs.0.00	Rs.0.00	Rs.0.00
Total cost per practical session (of 150 teachers each)					Rs.32,990	Rs.10,500	Rs.0	Rs.39,740	Rs.225.68	Rs.70.00	Rs.314.32	Rs.585.00

+ Salary for RETT staff has been included under administrative costs of project.

@ Teachers have "foregone opportunities" to the extent they are away from their home and lose discretionary time which may have been used for remunerative work or non-remunerative leisure activities.

* No monetized value given to the trainees' foregone opportunity costs--though there are costs--resulting from spending 7 days away from home and losing full, free use of discretionary time outside of working hours. (Though it could arguably be valued at hourly wage rates.)

"Additional expenses" represent the difference between what participants receive in the form of per diem allowances, and the assumed subsistence cost of Rs.35 per day.
In the case of RETT BTT participants, they receive Rs.30 + 5 per day of 5-day session, but none on travel days--average 2 travel days per teacher.

"Lost teaching" represents a monetized value for the instructional time not realized by students as a result of the teacher being away from school at training; it has been valued at the average teacher's wage. This cost is actually borne 100% by the government (for primary teachers) and 50% by government and 50% by student fees (for high school teachers--i.e., trainers). The total value of lost teaching time has been listed as "community cost" since the loss is to the schools.

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Table C.

PER TRAINEE COST OF RADIO-BASED BTT PRACTICAL SESSIONS

	TOTAL PER TRAINEE COST OF PRACTICAL SESSIONS			
ACTIVITY	GOVT. (Rs.)	TEACHERS (Rs.)	COMMUNITY (Rs.)	TOTAL (Rs.)
Training-of-trainers	Rs.23.59	Rs.0.00	Rs.3.14	Rs.25.58
Practical session	Rs.225.68	Rs.70.00	Rs.314.31	Rs.579.25
TOTAL COSTS	Rs.249.27	Rs.70.00	Rs.317.45	Rs.604.83

Data are from previous tables A and B. Foregone opportunities of teachers and high school teachers serving as trainers have not been costed.

Table D.

COSTS OF TRAINING 32 BTT TRAINERS IN A SESSION
Session: 16 days*
Travel: 2 x 2 days
Trainers-of-trainers: 14 Faculty of Education (univ.) faculty##
Trainees: 26 supervisors & 6 high school teachers

PERSONNEL	ITEM	NO.	@ AMOUNT (Rs.)	UNIT	COSTS OF TRAINING 32 BTT TRAINERS IN A SESSION GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)	PER TEACHER TRAINEE COST ASSUMING 3000 ENROLLMENT GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)
Trainers--												
Campus chief	In-charge allwnc	1 x	Rs.2,000		Rs.2,000			Rs.2,000	0.67			0.67
FOE staff	admin allwnce		Rs.1,500	per session	Rs.1,500			Rs.1,500	0.50			0.50
Univ. staff	per diem	7 staff** x	Rs.55 x	20 days	Rs.7,700			Rs.7,700	2.57			2.57
	remuneration	14 staff x	Rs.100 x	16 days	Rs.22,400			Rs.22,400	7.47			7.47
	travel	7 staff x	Rs.1,000		Rs.7,000			Rs.7,000	2.33			2.33
	75% salary	14 staff*** x	Rs.114 x	15 days	Rs.23,951		#	Rs.23,951	7.98			7.98
Trainers in training--												
Supervisors	per diem	26 suprvsrs x	Rs.55 x	20 days	Rs.28,600			Rs.28,600	9.53			9.53
	travel	26 suprvsrs x	Rs.1,000		Rs.26,000			Rs.26,000	8.67			8.67
	salary	26 suprvsrs x	Rs.13 x	155 hrs	Rs.53,793			Rs.53,793	17.93			17.93
H.S. teachrs	per diem	6 HS tchrs x	Rs.55 x	20 days	Rs.6,600			Rs.6,600	2.20			2.20
	travel	6 HS tchrs x	Rs.1,000		Rs.6,000			Rs.6,000	2.00			2.00
	foregone opp.@	6 HS tchrs x	@ x	155 hrs		Rs.0		Rs.0		0.00		
	lost tching@@@	6 HS tchrs x	Rs.20 x	85 hrs			Rs.9,995	Rs.9,995			3.33	3.33
NON-PERSONNEL												
Building	rent ###	2 rooms x	Rs.1,000 x	0.5 mo.	Rs.1,000			Rs.1,000	0.33			0.33
Materials	handouts	1 set x	Rs.90 x	32 trnrs	Rs.2,880			Rs.2,880	0.96			0.96
Contingency			Rs.1,000		Rs.1,000			Rs.1,000	0.33			0.33
TOTAL COSTS OF TRAINING 32 BTT TRAINERS					Rs.190,423.64	Rs.0.00	Rs.9,995.25	Rs.200,418.90	Rs.63.47	Rs.0.00	Rs.3.33	Rs.66.81

ASSUMPTION: Each of these trained trainers will (between now and the year 2000) train 12 groups of 50 teachers; thus trainer:trainee ratio is 1:100

* English trainings are 21 days; others are 14 days--assumed average is 16.

** Assumption is made that (on the average) 50% of FOE staff will be residents and will not be paid travel & per diem

*** FOE faculty are paid 75% of their salary when sessions are held during vacation periods--assumption is made that 75% of sessions are.

\# Assumes that university faculty are participating during their vacation time

\#\# Two faculty members per each of 7 subjects

\#\#\# "Rent" is a shadow price representing value of donated facilities use in training.

@ Teachers have "foregone opportunities" to the extent they are away from their home and lose discretionary time which may have been used for remunerative work or non-remunerative leisure activities.

@@ No monetized value given to the trainers' foregone opportunity costs--though there are costs--resulting from spending 7 days away from home and losing full, free use of discretionary time outside of working hours. (Though it could arguably be valued at hourly wage rates.)

@@@ "Lost teaching" represents a monetized value for the instructional time not realized by students as a result of the teacher being away from school at training; it has been valued at the average teacher's wage. This cost is actually borne 100% by the government ((for primary teachers) and 50% by government and 50% by student fees (for high school teachers--i.e., trainers). The total value of lost teaching time has been listed as "community cost" since the loss is to the schools.

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Table E.

BTT TRAINING SESSIONS CONDUCTED BY MOEC/REGIONAL DIRECTORATE

Costs per BTT Session of 30 days for 50 trainees
Travel: 2 x 1 day
Trainers: 5 (4 supervisors + 1 H.S. teachers)
Trainees: 50 primary school teachers

PERSONNEL	ITEM	NO.	@ AMOUNT (Rs.)	UNIT	COSTS OF 30-DAY BTT SESSION FOR 50 TEACHERS				PER TEACHER TRAINEE COST ASSUMING 50 ENROLLMENT			
					GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)	GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)
Trainers--												
In-charge	allowance	1	150		150			150	3			3
Supervisors	per diem	4 suprvsrs	55	x 32 days	7,040			7,040	141			141
	travel	4 suprvsrs	1,000		4,000			4,000	80			80
	salary	4 suprvsrs	86	32 days	11,034			11,034	221			221
H.S. teachrs	per diem	1 HS tchrs	55	x 32 days	1,760			1,760	35			35
	travel	1 HS tchrs	1,000		1,000			1,000	20			20
	foregone opp.@	1 HS tchrs	*	214 hrs		0		0		0		0
	lost tching ##	1 HS tchrs	20	158 hrs			3,097	3,097			62	62
Trainees--												
Prim. tchrs	travel +	50 tchrs	100		5,000			5,000	100			100
	snack allwnce@	50 tchrs	4	x 30 days	5,250			5,250	105			105
	foregone opp@@	50 tchrs	*	x 236 hrs		0		0		0		0
	addt'l expns #	50 tchrs	32	x 32 days		50,400		50,400		1,008		1,008
	lost tching ##	50 tchrs	Rs.10.87	x 134 hrs			72,862	72,862			1,457	1,457
NON-PERSONNEL												
Building	rent ###	3 rooms	1,000	x 1 mo.	3,000			3,000	60			60
Materials	books/handouts	1 set	89	x 50 tchrs	4,425			4,425	89			89
Contingency	& miscllaneous		1,021		1,021			1,021	20			20
Total cost for Face-to-face BTT session for 50 trainees					Rs.43,680.48	Rs.50,400.00	Rs.75,958.72	Rs.170,039.21	Rs.873.61	Rs.1,008.00	Rs.1,519.17	Rs.3,400.78

+ Teachers are paid lump sum "travel allowance" of Rs. 75 (if in one's district) and Rs. 125 (if in a different district). Rs. 100 is used, assuming 50-50 ratio of teachers being in- and out-of-district..

@ Teachers are given "snack allowance" of Rs. 3 per day in accessible areas and Rs. 4.50 in remote areas; Rs. 3.50 is used here on assumption that 2/3 trainings are in accessible areas, 1/3 in remote.

@@ Teachers have "foregone opportunities" to the extent they are away from their home and lose discretionary time which may have been used for remunerative work or non-remunerative leisure activities.

* No monetized value given to the trainees' foregone opportunity costs--though there are costs--resulting from spending 7 days away from home and losing full, free use of discretionary time outside of working hours. (Though it could arguably be valued at hourly wage rates.)

"Additional expenses" represent the difference between what participants receive in the form of per diem allowances, and the assumed subsistence cost of Rs.35 per day. In the case of RETT BTT participants, they receive Rs.35 per day of 5-day session, but none on travel days--average 2 travel days per teacher.

"Lost teaching" represents a monetized value for the instructional time not realized by students as a result of the teacher being away from school at training; it has been valued at the average teacher's wage. This cost is actually borne 100% by the government (for primary teachers) and 50% by government and 50% by student fees (for high school teachers--i.e., trainers). The total value of lost teaching time has been listed as "community cost" since the loss is to the schools.

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Table F.

PER TRAINEE COST OF FACE-TO-FACE BTT SESSION
AS CONDUCTED BY REGIONAL EDUCATION DIRECTORATES
(TRAINING-OF-TRAINERS CONDUCTED BY FACULTY OF EDUCATION)

	TOTAL PER TRAINEE COST OF FACE-TO-FACE SESSION:			
ACTIVITY	GOVT. (Rs.)	TEACHERS (Rs.)	COMM. (Rs.)	TOTAL (Rs.)
Training-of trainers	Rs.63.47	Rs.0.00	Rs.3.33	Rs.66.81
BTT training	Rs.873.61	Rs.1,008.00	Rs.1,519.17	Rs.3,400.78
TOTAL COSTS	Rs.937.08	Rs.1,008.00	Rs.1,522.51	Rs.3,467.59

Data are from previous tables D and E. Foregone opportunities of teachers and high school teachers serving as trainers have not been costed.

Table G.

DESCRIPTION OF COSTS BORNE BY TEACHERS PARTICIPATING IN RADIO-BASED B.T.T. COURSE

ACTIVITY	COSTS (per teacher)	DESCRIPTION OF COSTS (purchases, teachers' opportunity costs, subsistence costs)
RADIOS		
Transistors	Rs.700	Teachers purchase of project radio @ Rs.700 each
Batteries	Rs.256	Rs. 8.00 X 4 batteries X 8 sets
Diffusion (125 hrs)	-	
Reception (125 hrs)	Rs.1,359 *	Rs. 10.87 X 125 hrs evening listening time
SELF-INSTRUCTIONAL MATERIALS		
SIMs production/distribution/use	Rs.1,723 *	Rs. 10.87 X 480 lessons X 0.33 hrs per lesson
FINAL EXAMINATION		2 days for exam + 2 days travel (average)
Administration/sitting	Rs.522 *	Rs. 10.87 X 12 hours X 4 days travel
EVALUATION/SUPERVISION		
Aerogram feedback (questionnaire 1/mo.)	Rs.22 *	Rs. 10.87 X 8 aerograms X 0.25 hrs time to fill out
Monitoring by project	Rs.0	no costs to teachers
Supervisors' workshops	Rs.0	no costs to teachers
Field supervision by DEO's	Rs.0	no costs to teachers
Resource teacher system (3 hr. session; 1/mo.)	Rs.609 *	Rs. 10.87 X 8 sessions X 7 hrs' Saturday time
Practical sessions	Rs.913 *	Rs. 10.87 X 12 hrs. X 7 days (incl. travel days)
(30 hrs. in 5 days)	Rs.70	Rs. 35 X 2 travel days' subsistence costs
Teacher orientation (1/2 day session)	Rs.261 *	Rs. 10.87 X 12 hrs. X 2 days
TOTAL COSTS FOR TEACHERS		
	Rs.6,435	*including* foregone opportunity costs
or...	Rs.1,026	*excluding* foregone opportunity costs *

* Costs marked with an asterisk (*) are forgone opportunity costs for the participating teachers which are, in this table, monetized at their average hourly salary rate. If included in cost calculations, total cost borne by teachers is Rs. 6435; if excluded (as they have been in the study) the cost is Rs. 1026.

Table H.

NO. HOURS WORKED BY TEACHERS

	PRIMARY	HIGH SCHOOL
TOTAL DAYS IN YEAR:	365.0	365.0
minus:		
LONG VACATION DAYS*	60.0	60.0
LOCAL HOLIDAYS**	5.0	5.0
NATIONAL HOLIDAYS***	24.7	24.7
SATURDAYS	52.0	52.0
NET AVERAGE TEACHING DAYS:	223.3	223.3
of which are Fridays:	37.2	37.2
school hours on Fridays: #	3.5	3.5
of which are Sun-Thur:	186.1	186.1
schl hrs/day, Sun - Th: ##	5.0	6.0
total school hours/yr:	1060.6	1246.7

* Each school may schedule 60 days of long vacation time per year.

** In addition, each school gets 5 days for local festivals.

*** Actually, there are 34.5 gazetted holidays (excluding 2.5 women-only holidays); since holidays are not made up when they fall on Saturdays, 6/7 of 34.5 is presumed to be the number of actual gazetted holidays per year; and 60/365 of 6/7 of 34.5 is subtracted for the number of holidays presumbed to fall within the school's 60-day long vacation period.

All schools are in session from 10 a.m. - 1:30 p.m. on Fridays.

Primary schools are in session 10 a.m. - 3 p.m. Sunday-Thursday, whereas high schools are in session until 4 p.m.

Table I.

AVERAGE TEACHER SALARIES--per hour of school time

	PRIMARY	HIGH SCHOOL
AVERAGE SALARY PER MONTH:	Rs.887.25	1,879.50
x 13 months* =	Rs.11,534.25	Rs.24,433.50
/ teaching hours**	1060.6	1246.7
= AVERAGE SALARY PER HOUR:	Rs.10.87	Rs.19.60

Salary figures assume 50% employees are temporary receiving no benefits, and 50% are permanent, receiving 10% benefits.

* All public and most private employees in Nepal receive an extra (13th) month's salary in September prior to the Dashain holidays.

** from Table H.

Table J.

NO. HOURS WORKED BY FACULTY & MOEC SUPERVISORS

	T.U. FACULTY	SUPERVISORS
TOTAL DAYS IN YEAR:	365.0	365.0
minus:		
UNIVERSITY VACATION DAYS:	80.0	n.a.
NATIONAL HOLIDAYS***	17.6	29.6
SATURDAYS	52.0	52.0
NET AVERAGE WORKING DAYS:	215.4	283.4
of which are Fridays:	35.9	47.2
office hours on Fridays: #	5.0	5.0
of which are Sun-Thur:	179.5	236.2
schl hrs/day, Sun - Th: ##	6.75	6.75
total working hours/yr:	1391.3	1830.5
total working days/yr:	215.4	283.4
total working hours/day:	6.5	6.5

* T.U. schedules 50 days of vacation time plus 30 days during Dashain/Tihar holidays per year.

*** There are 34.5 gazetted holidays (excluding 2.5 women-only holidays); since holidays are not made up when they fall on Saturdays, 6/7 of 34.5 is presumed to be the number of actual gazetted holidays per year; university holidays are further adjusted for the number of holidays presumed to fall within the school's vacation periods.

Offices are in session from 10 a.m. - 3 p.m. on Fridays.

Offices are in session 10 a.m. - 5 p.m. Sunday-Thursday, February 16 - November 15, and 10 - 4 November 16 - February 15. Average working hours are, therefore, 6.75 per day Sun - Thurs.

Table K.

AVERAGE PROFESSIONAL SALARIES--per day and per hour

	T.U. FACULTY	SUPERVISOR
AVERAGE SALARY PER MONTH: #	Rs.2,520.00	Rs.1,879.50
x 13 months* =	Rs.32,760.00	Rs.24,433.50
/ teaching hours**	1391.3	1830.5
= AVERAGE SALARY PER DAY:	Rs.152.07	Rs.86.21
= AVERAGE SALARY PER HOUR:	Rs.23.55	Rs.13.35

Salary figures assume 50% employees are temporary receiving no benefits, and 50% are permanent, receiving 10% benefits.

* All public and most private employees in Nepal receive an extra (13th) month's salary in September prior to the Dashain holidays.

** from Table No. J.

Table L.

MOEC/REGIONAL DIRECTORATE "FACE-TO-FACE" BASIC TEACHER TRAINING COURSE ACTIVITY	ANALYSIS OF AVERAGE (FIXED & VARIABLE) COSTS FOR OPERATION OF "FACE-TO-FACE" BASIC TEACHER TRAINING COURSE (Based on 1988-89 BTT figures)										
	COSTS TO GOVERNMENT		COSTS TO TEACHERS	COSTS TO COMMUNITY	SOCIAL COSTS (GOVT+TCHR+COMM)		PROJECTED COURSE COSTS AT VARIOUS ENROLLMENTS:				
	FIXED	VARIABLE	VARIABLE	VARIABLE	FIXED	VARIABLE	800	1000	2000	3000	5000
ADMINISTRATIVE COSTS (MOEC Teacher Training Unit 8 fte staff) **	115,173				115,173	0	115,173	115,173	115,173	115,173	115,173
Office space in MOEC ***	10,800				10,800	0	10,800	10,800	10,800	10,800	10,800
INSTRUCTIONAL MATERIALS	2,000	10			2,000	10	10,000	12,000	22,000	32,000	52,000
FINAL EXAMINATION (during BTT; no extra time)	10,000	10			10,000	10	18,000	20,000	30,000	40,000	60,000
TRAINING OF TRAINERS (Ave. annual recurrent need: to train 3[illegible] trainers)	1,000	63	0	3	1,000	67	54,445	67,806	134,613	201,419	335,031
BTT SESSIONS (30 days x 5 hrs; 5 trainers/50 trainees; 3000 trainees per year)	1,000	874	1,008 *	1,519	1,000	3,401	2,721,627	3,401,784	6,802,568	10,203,352	17,004,921
TOTAL COSTS	Rs.139,973	Rs.957	Rs.1,008	Rs.1,523	Rs.139,973	Rs.3,488	2,930,045	3,627,563	7,115,153	10,602,744	17,577,925
UNIT COST (PER ENROLLEE).....							Rs.3,663	Rs.3,628	Rs.3,558	Rs.3,534	Rs.3,516

* Rs. 1,008 is "additional expenses" borne by teachers as a result of the daily allowances being less than cost of room & board during training. The foregone opportunities, resulting from teachers being away from home and losing free use of discretionary time have not been costed. If valued at teachers' hourly salary rate, the opportunity costs for high school trainers and primary school trainees would total to Rs. 6760 per trainee.

** This represents staff salaries and benefits pro-rated at 45% of their workload assigned to teacher trainings conducted by MOEC/Regional Directorates.

*** This represents the shadow price for the space occupied by the Teacher Training unit in the MOEC building, pro-rated at 45%, the share of the overall teacher training annual target (6667 teachers) trained by MOEC/Reg.Directorates.

Table M.

RADIO-BASED BASIC TEACHER TRAINING COURSE ACTIVITY	ANALYSIS OF AVERAGE (FIXED & VARIABLE) COSTS FOR OPERATION OF R.E.T.T. BASIC TEACHER TRAINING COURSE (Based on data from 1988-89 fiscal year and BTT session)											
	COSTS TO GOVERNMENT		COSTS TO TEACHERS	COSTS TO COMMUNITY	SOCIAL COSTS (GOVT+TCHRS+COMM)		PROJECTED COURSE COSTS AT VARIOUS ENROLLMENT LEVELS:					
	FIXED	VARIABLE	VARIABLE	VARIABLE	FIXED	VARIABLE	800	1000	2000	3000	5000	6000
ADMINISTRATIVE COSTS												
Professional staff #	697,805				697,805		697,805	697,805	697,805	697,805	697,805	697,805
Non-professional staff ##	343,695				343,695		343,695	343,695	343,695	343,695	343,695	343,695
Recording studios ###	186,050				186,050		186,050	186,050	186,050	186,050	186,050	186,050
Building (excl. studio)####	605,653				605,653		605,653	605,653	605,653	605,653	605,653	605,653
RADIOS												
Transistors		100	700		0	800	640,000	800,000	1,600,000	2,400,000	4,000,000	4,800,000
Batteries			256		0	256	204,800	256,000	512,000	768,000	1,280,000	1,536,000
Diffusion (125 hrs)	750,000				750,000	0	750,000	750,000	750,000	750,000	750,000	750,000
Reception (125 hrs)			•		0	0	0	0	0	0	0	
RADIO LESSONS												
Studio production original 480 lessons @	62,557				62,557		62,557	62,557	62,557	62,557	62,557	62,557
annual revisions	9,600				9,600		9,600	9,600	9,600	9,600	9,600	9,600
SELF-INSTRUCTIONAL MATERIALS												
SIMs production/distribution/use		150	•			150	120,000	150,000	300,000	450,000	750,000	900,000
FINAL EXAMINATION												
Administration/sitting	20,000	40	•	245	20,000	285	248,000	305,000	590,000	875,000	1,445,000	1,730,000
EVALUATION/SUPERVISION												
Aerogram feedback (questionnaire 1/mo.)		10	•		0	10	8,000	10,000	20,000	30,000	50,000	60,000
Monitoring by project	22,000				22,000	0	22,000	22,000	22,000	32,000	52,000	52,000
Supervisors workshops	32,000				32,000	0	32,000	32,000	32,000	46,000	74,000	74,000
Field supervision by DEOs	28,000	0			28,000	0	28,000	28,000	28,000	54,000	106,000	106,000
Resource teacher system (3 hr. session; 1/mo.)		44	•	0	0	44	35,200	44,000	88,000	132,000	220,000	264,000
Practical sessions (30 hrs. in 5 days)		249	70	317	0	637	509,379	636,723	1,273,446	1,910,169	3,183,616	3,820,339
Teacher orientation (1/2 day session)		40	•		0	40	32,000	40,000	80,000	120,000	200,000	240,000
TOTAL COSTS.....	Rs.2,757,361	Rs.633	Rs.1,026	Rs.562	Rs.2,757,361	Rs.2,222	4,534,739	4,979,084	7,200,807	9,472,530	14,015,976	16,237,700
UNIT COST (PER ENROLLEE).....							Rs.5,668	Rs.4,979	Rs.3,600	Rs.3,158	Rs.2,803	Rs.2,706

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Table M.

* These activities require that teachers use their discretionary time for BTT activities, resulting in foregone opportunities, which have not been assigned monetary values here. At the teacher's hourly salary rate, these would total to Rs. 5,409--see section for discussion.

@ Production costs exclude time of RETT staff which is counted under administrative costs; cost of original lessons has been amortized over 12 years of expected use.

It is assumed that 75% of RETT Project's effort goes toward BTT program(25% towards other developmental activities). 75% of total salaries and benefits = Rs. 1,041,500, of which 67% goes for professional staff and their support.

33% of salaries and benefits for non-professional staff.

Again, assumed that 75% of office activities are for BTT; this cost is annualized cost of studio equipment and rooms at 1988 prices.

RETT Project complex was constructed in two phases; total costs have been converted to 1988 prices (Rs. 4,100,000) and annualized over 50 years; 75% of this taken as costs due to BTT course.

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Table N

RADIO-BASED BASIC TEACHER TRAINING COURSE TWO SESSIONS PER YEAR +	COSTS TO GOVT. FIXED	COSTS TO GOVT. VARIABLE	COSTS TO TEACHERS VARIABLE	COSTS TO COMMUNITY VARIABLE	SOCIAL COSTS (GOVT+TCHRS+COMM) FIXED	SOCIAL COSTS (GOVT+TCHRS+COMM) VARIABLE	PROJECTED COURSE COSTS AT VARIOUS ENROLLMENT LEVELS: 1600	2000	3000	4000	5000	6000	10000
ADMINISTRATIVE COSTS													
Professional staff #	343,695				343,695		343,695	343,695	343,695	343,695	343,695	343,695	343,695
Non-professional staff ##	767,586				767,586		767,586	767,586	767,586	767,586	767,586	767,586	767,586
Recording studios ###	186,050				186,050		186,050	186,050	186,050	186,050	186,050	186,050	186,050
Building (excl. studio)####	605,653				605,653		605,653	605,653	605,653	605,653	605,653	605,653	605,653
RADIOS													
Transistors		100	700		0	800	1,280,000	1,600,000	2,400,000	3,200,000	4,000,000	4,800,000	8,000,000
Batteries			256		0	256	409,600	512,000	768,000	1,024,000	1,280,000	1,536,000	2,560,000
Diffusion (125 hrs)	1,500,000				1,500,000	0	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Reception (125 hrs)			•		0	0							
RADIO LESSONS													
Studio production original 480 lessons @	62,557				62,557		62,557	62,557	62,557	62,557	62,557	62,557	62,557
annual revisions	9,600				9,600		9,600	9,600	9,600	9,600	9,600	9,600	9,600
SELF-INSTRUCTIONAL MATERIALS													
SIMs production/distribution/use		150	•			150	240,000	300,000	450,000	600,000	750,000	900,000	1,500,000
FINAL EXAMINATION													
Administration/sitting	40,000	40	•	245	40,000	285	496,000	610,000	895,000	1,180,000	1,465,000	1,750,000	2,890,000
EVALUATION/SUPERVISION													
Aerogram feedback (questionnaire 1/mo.)		10	•		0	10	16,000	20,000	30,000	40,000	50,000	60,000	100,000
Monitoring by project	38,500				38,500	0	38,500	38,500	38,500	38,500	38,500	38,500	38,500
Supervisors workshops	48,000				48,000	0	48,000	48,000	48,000	48,000	48,000	48,000	48,000
Field supervision by DEOs	49,000	0			49,000	0	49,000	49,000	49,000	49,000	49,000	49,000	49,000
Resource teacher system (3 hr. session; 1/mo.)		44	•	0	0	44	70,400	88,000	132,000	176,000	220,000	264,000	440,000
Practical sessions (30 hrs. in 5 days)		249	70	317	0	637	1,018,757	1,273,446	1,910,169	2,546,893	3,183,616	3,820,339	6,367,231
Teacher orientation (1/2 day session)		40	•		0	40	64,000	80,000	120,000	160,000	200,000	240,000	400,000
TOTAL COSTS.....	3,650,641	633	1,026	562	3,650,641	2,222	7,205,398	8,094,068	10,315,811	12,537,534	14,759,257	16,980,980	25,867,873
UNIT COST (PER ENROLLEE).....							Rs.4,503	Rs.4,047	Rs.3,439	Rs.3,134	Rs.2,952	Rs.2,830	Rs.2,587
							1600	2000	3000	4000	5000	6000	10000

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• These activities require that teachers use their discretionary time for BTT activities, resulting in foregone opportunities, which have not been assigned monetary values here. At the teacher's hourly salary rate, these would total to Rs. 5,409--see section for discussion.

@ Production costs exclude time of RETT staff which is counted under administrative costs; cost of original lessons has been amortized over 12 years of expected use.

Table N

\# It is assumed that 75% of RETT Project's effort goes toward BTT program (25% towards other developmental activities). 75% of total salaries and benefits = Rs. 1,041,500, of which 67% goes for professional staff and their support.

\## 33% of salaries and benefits for non-professional staff.

\### Again, assumed that 75% of office activities are for BTT; this cost is annualized cost of studio equipment and rooms at 1988 prices.

\#### RETT Project complex was constructed in two phases; total costs have been converted to 1988 prices (Rs. 4,100,000) and annualized over 25 years; 75% of this taken as costs due to BTT course.

\+ The following assumptions were made in projecting the costs of RETTP BTT programs if daily broadcasts were increased from 30 minutes per day to one hour per day, thereby allowingthe completion of two four-and-one-half month sessions per year:

1) Variable (per teacher) costs will not change;
2) Cost of radio lesson production, studio & building capital costs, and professional staff will remain the same;
3) Cost of non-professional staff will increase by factor of 10% (representing three additional positions;
4) Cost of supervisors workshops will increase by 50% (but not double since already-trained supervisors can be utilized in more districts;
5) Cost of district monitoring by RETT Project and field supervision by DEOs/supervisors will increase by 75%;
6) Cost of air time on Radio Nepal and cost of final examination will increase by 100%.

Table O.

NUMBERS OF TEACHERS ENROLLED IN & PASSING BASIC TEACHER TRAINING COURSES OFFERED BY FIVE DIFFERENT AGENCIES, 1987 - 1990

AGENCY --> YEAR & DATA	**MOEC/R.E.D.** REGIONAL EDUCATION DIRECTORATES	**F.O.E.** FACULTY OF EDUCATION	**P.E.P.** PRIMARY EDUCATION PROJECT	**SETI PROJECT** ERD–SETI ZONE PROJECT	**RETTP** RADIO EDUC. TCHR TRNG PROJECT	**TOTAL:** FOUR FACE–TO FACE PROGRAMS
1987-88:						
Enrolled	850	1300	150	-	987	2300
Passed	850	1300	150	-	*	2300
Pct. passed	100.0%	100.0%	100.0%	-	*	100.0%
1988-89:						
Enrolled	2583	831	921	210	598	4545
Passed	2404	721	761	189	1079	4075
Pct. passed	93.1%	86.8%	82.6%	90.0%	68.1%	89.7%
1989-90:						
Enrolled	2227	395	617	284	1789	3523
Passed	2171	379	617	284	829	3451
Pct. passed	97.5%	95.9%	100.0%	100.0%	46.3%	98.0%
3-YR. TOTALS:						
Enrolled	5660	2526	1688	494	3374	10368
Passed	5425	2400	1528	473	1908	9826
Pct. passed	95.8%	95.0%	90.5%	95.7%	56.6%	94.8%

* Teachers enrolled in both 1987-88 and 1988-89 sessions took the final examination together in June, 1989

ABOUT THE AUTHORS

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JOHN K. MAYO is Professor of Communication and Director of the Center for International Studies at Florida State University. His association with radio distance education in Nepal dates back more than 15 years. In 1974, he directed the inter-agency Radio Feasibility Study Team whose recommendations led to the founding of the RETTP.